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**Tourist use of public transport at destinations – the case of
Munich, Germany**

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PREFACE

This dissertation “Tourist use of public transport at destinations – the case of Munich, Germany” was submitted to the Technische Universität München in fulfilment of the requirements for the degree of Dr.rer.pol. In the five accompanying papers to this dissertation (Appendix 1-5), I am the first author, under the name Diem-Trinh Le-Klähn. In all papers, I was responsible for most of the work, including research design, data collection and analysis, as well as manuscripts write-up. The co-authors provided background knowledge, expert advice, supervision of the project and edition of the papers.

The five papers (listed below) include one published peer-reviewed book chapter, two published journal articles, one accepted paper, and one submitted manuscript on the topic of tourism and public transport.

1. Paper I: **Le-Klähn, D-T.**, & Hall, C.M. Tourist use of public transport at destinations – A review. *Current Issues in Tourism* (accepted).
2. Paper II: **Le-Klähn, D-T.**, Roosen, J., Gerike, R., & Hall, C.M. Modelling tourist choice of transport mode and areas visited at destinations. *Tourism Geographies* (submitted).
3. Paper III: **Le-Klähn, D-T.**, Gerike, R., & Hall, C.M. (2014). Visitor users vs. non-users of public transport: The case of Munich, Germany. *Journal of Destination Marketing and Management*. <http://dx.doi.org/10.1016/j.jdmm.2013.12.005>
4. Paper IV: **Le-Klähn, D-T.**, Hall, C.M., & Gerike, R. (2014). Analysis of visitors’ satisfaction with public transport in Munich, Germany. *Journal of Public Transportation*, 17(3), 68-85.
5. Paper V: **Le-Klähn, D-T.**, Hall, C.M., & Gerike, R. (2014). Promoting public transport use in tourism. In S. Cohen, J. Higham, P. Peeters, & S. Gössling (Eds.), “*Understanding and governing sustainable tourism mobility*”, (pp. 208-222). Abingdon: Routledge.

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ABSTRACT

This dissertation examines the use of public transport by tourists in Munich, Germany. The central question of this study is “How should tourist use of public transport at destinations be encouraged?” Munich, as a major gateway tourism city in Germany, and a city with a well-developed public transport network, provides an excellent context for this study.

The dissertation is accompanied by five papers, all of which discuss different aspects of public transport use at tourism destinations based on a literature review and two empirical studies. It was found that the majority of visitors used public transport while travelling within and around Munich. Several factors influence tourists’ transport mode choice, motivations to use and satisfaction with public transport in Munich. To attract tourists, the public transport system has to be easy to use, comfortable to travel, and offer frequent service. Furthermore, the dissertation shows that visitor’s decisions on transport mode and areas visited are not necessarily related. This suggests that an efficient public transport system can support the dispersal of tourists and contribute to sustainable urban tourism.

Findings from this study significantly contribute to research on sustainable tourism mobility at destinations. It is evident that public transport has a great potential as an attractive alternative mode of transport at urban tourism destinations. However, there are some challenges that need to be overcome in implementing sustainable transport policies. Of most importance, the target public transport visitor-users should be reached by appropriate marketing strategies; thus knowledge of the visitor characteristic and transport behaviour is vital.

Keywords: public transport, urban tourism, destination, sustainable tourism, sustainable mobility.

ZUSAMMENFASSUNG

In dieser Dissertation wird die Nutzung von öffentlichen Verkehrsmitteln (ö.V.) in München, Deutschland, untersucht. Die Kernfrage dieser Studie ist wie die Nutzung von ö.V. in städtischen Reisezielen des Tourismus gefördert werden kann. München bietet dazu als großes städtisches Einfallstor für Touristen mit dem Ziel Deutschland und mit einem gut entwickelten ö.V. Netzwerk äußerst geeignete Rahmenbedingungen für diese Studie.

Diese Dissertation beinhaltet fünf Veröffentlichungen, die jeweils verschiedene Aspekte der Nutzung von ö.V. an touristischen Reisezielen behandeln und auf einer Zusammenfassung der bisherigen relevanten Literatur sowie auf zwei empirischen Studien basieren. Es ergab sich, dass die Mehrzahl der Touristen ö.V. nutzen, während sie innerhalb und in der Umgebung von München reisen. Mehrere Faktoren beeinflussen dabei die Transportmittelwahl von Touristen, einschließlich der Nutzungsmotivation und Zufriedenheit mit dem ö.V.-Service in München. Um für Touristen attraktiv zu sein müssen ö.V. einfach zu benutzen sein, komfortables Reisen ermöglichen und der Service muss regelmäßig angeboten werden. Außerdem zeigen die Ergebnisse, dass die Wahl von Transportmittel und von Zielort nicht unbedingt voneinander abhängen. Das weist darauf hin, dass ein effizientes ö.V.-System die Verteilung von Touristen unterstützt und außerdem zu einem nachhaltigen städtischen Tourismus beiträgt.

Die Ergebnisse dieser Studie beinhalten einen wesentlichen Beitrag zur Forschung der nachhaltigen Mobilität von Touristen am Zielort. Es ist offenkundig, dass ö.V. ein großes Potential als attraktive alternative Transportmittel an städtischen Zielorten von Touristen aufweisen. Jedoch sind auch einige Herausforderungen zu überwinden um entsprechende Verordnungen für nachhaltigen Transport umzusetzen. Am wichtigsten ist, dass die Zielgruppe der touristischen ö.V. Nutzer durch geeignete Marketingstrategien erreicht werden. Daher ist eine Kenntnis der Charakteristiken und des Transportverhaltens von Besuchern essentiell.

Schlüsselwörter: öffentliche Verkehrsmittel, städtischer Tourismus, Reiseziel, nachhaltiger Tourismus, nachhaltige Mobilität.

TABLE OF CONTENTS

1. Introduction	1
1.1 Research motivation	1
1.2 Research context	4
1.2.1 Tourism in Munich.....	4
1.2.2 Public transport in Munich.....	4
1.3 Theoretical framework	5
1.4 Research questions and objectives	7
1.5 Structure of the dissertation	10
2. Key terms and concepts	10
2.1 Sustainable tourism	10
2.2 Sustainable mobility	11
2.3 Public transport	12
2.4 Visitor/ Tourist/ Excursionist	12
2.5 Destination	13
2.6 The Munich region	13
3. Methods	13
3.1 Overview	13
3.2 Subproject 1 – Literature review: Overview of tourist use of public transport at destinations	16
3.3 Subproject 2 – Survey A: Tourist choice of transport mode use and areas visited in the Munich region	17
3.3.1 Questionnaire development.....	17
3.3.2 Sample and survey site selection.....	17
3.3.3 Pilot tests.....	18
3.3.4 Main survey.....	18
3.3.5 Data analysis.....	19
3.4 Subproject 3 – Survey B: Tourist use of public transport in Munich	22
3.4.1 Questionnaire development.....	22
3.4.2 Sample and survey site selection.....	23
3.4.3 Pilot tests.....	23
3.4.4 Main survey.....	23
3.4.5 Data analysis.....	24

3.5	Methodological limitations	26
4.	Results	27
4.1	Paper I: Tourist use of public transport at destinations: A review	28
4.2	Paper II: Modelling tourist choice of transport mode and areas visited at destinations	29
4.3	Paper III: Visitor users vs. non-users of public transport: The case of Munich, Germany	30
4.4	Paper IV: Analysis of visitor satisfaction with public transport in Munich	31
4.5	Paper V: Promoting public transport use in tourism	32
5.	Discussion and conclusions	33
5.1	Discussion	33
5.1.1	Factors influencing tourist use of public transport	33
5.1.2	The target visitor-users of public transport	36
5.1.3	What makes an attractive public transport system to visitors?	37
5.1.4	Challenges to sustainable tourist mobility	39
5.2	Conclusion	40
5.3	Future research	44
	References	46
	Appendix 1: Paper I	57
	Appendix 2: Paper II	58
	Appendix 3: Paper III	59
	Appendix 4: Paper IV	60
	Appendix 5: Paper V	61
	Appendix 6:	62
	Information Hand-out & Questionnaire Survey A	62
	Appendix 7:	67
	Information Hand-out & Questionnaire Survey B	67

LIST OF TABLES

Table 1: Tourist arrivals in Munich from 2010-2013.....	4
Table 2: Data collection and analysis methods	16
Table 3: KMO and Bartlett's Test of FA1.....	25
Table 4: KMO and Bartlett's Test of FA2.....	25
Table 5: KMO and Bartlett's Test of FA3.....	25
Table 6: KMO and Bartlett's Test of FA4.....	26
Table 7: Research questions addressed in papers.....	27
Table 8: New findings and major contributions to the literature by papers	41

LIST OF FIGURES

Figure 1: Proposed theoretical framework - Tourists' transport mode choice model.....	6
Figure 2: Structure of the research project	9
Figure 3: The dissertation's research paradigm.....	15
Figure 4: Tourists' use of public transport decision-making model	34
Figure 5: Promoting public transport use in tourism	43

LIST OF ACRONYMS

APTA	American Public Transportation Association
GNTB	German National Tourist Board
MVG	Münchner Verkehrsgesellschaft mbH (Munich Transport Company)
MVV	Münchner Verkehrs- und Tarifverbund (Munich Transport and Tariff Association)
UITP	International Association of Public Transport
UNWTO	World Tourism Organisation
WCED	World Commission on Environment and Development
VFR	Visiting Friends and Relatives

1. INTRODUCTION

1.1 RESEARCH MOTIVATION

Tourism plays an important role in the economy of many countries and have several economic and social benefits on the communities such as providing employment and business opportunities, economic diversification, and multiplier effect (e.g. Archer, Cooper, & Ruhanen, 2005; Gunn & Var, 2002; Lee & Brahmašreene, 2013; Milman & Pizam, 1988). However, tourism also can have negative impacts such as cultural erosion, crime, and damage to the environment (e.g. Amelung & Nicholls, 2014; Archer et al., 2005; Deery, Jago, & Fredline, 2012; Liu, Sheldon, & Var, 1987; Orams, 2002; Scott, Gössling, & Hall, 2012; Scott, Jones, & Konopek, 2007). To provide tourists with a positive experience, while ensuring the healthy development of the local community, many destinations have adopted sustainable tourism as an important concept in development plans (Gunn & Var, 2002; Honey, 2008).

Sustainable tourism covers several aspects, but an important focus is placed on environmental issues (Mowforth & Munt, 2009). Many tourism activities contribute to changes in land use, affect the ecology, and increase air and noise pollution (e.g. Cole, 2012; Hall & Lew, 2009; Honey, 2008; Mowforth & Munt, 2009; Tyrväinen, Uusitalo, Silvennoinen, & Hasu, 2014). However, as the majority of tourism emissions are from tourism transport (Dubois, Peeters, Ceron, & Gössling, 2011; Peeters & Dubois, 2010), sustainable tourist mobility is the most pressing requirement to achieve sustainability in tourism (Filimonau, Dickinson, & Robbins, 2014; Hall, 2013; Hall, 2011; Høyer, 2000).

According to Banister (2008), several actions are required to achieve sustainable mobility including a reduction in the need to travel (fewer trips), encouraging modal shift, reducing trip lengths, and encouraging greater efficiency in the transport system. However, tourism essentially is the movement of people between places for purposes such as exploring new places, novelty seeking, and getting to know different cultures and people (Hall, 2005). Reducing the need to travel or trip lengths could potentially conflict with the concept of tourism and

affect the income of destination communities. In fact, demand for travel and tourism has seen steady growth in the last years and will likely to continue growing in the future (Gössling, Hall, Peeters, & Scott, 2010; Graham, Papatheodorou, & Forsyth, 2008). Therefore, to accommodate the increasing number of tourists while maintaining sustainable mobility at the destination, it is important to encourage a modal shift and improve the efficiency of the transport system (Dickinson & Dickinson, 2006; Dickinson, Robbins, & Fletcher, 2009; Dubois et al., 2011; Filimonau et al., 2014; Martín-Cejas & Sánchez, 2010; Peeters & Dubois, 2010). Alternative transport modes for tourists at destinations include walking, cycling, and public transport. Nevertheless, walking is feasible only for short distances and cycling is limited to areas where bicycles and cycling support infrastructure are available. In addition, physical health could be another restriction. Increasing the share of public transport use has the most potential to support sustainable mobility, and hence it is the topic of this dissertation.

Public transport is usually considered as an additional tourism product, which adds to the total tourist experience (Page, 2005). However, in spite of high investment costs and potential value, some public transport systems are still not favoured by visitors (Bramwell, 1998; Duval, 2007). Meeting and even better exceeding customer expectations is essential for companies' high growth rates (Teye & Leclerc, 1998). To attract more users, public transport service suppliers need to understand the customer motivations, behaviours, and satisfaction. The tourism market has a high level of heterogeneity and tourists are diverse in their travel and movement patterns at a destination (McKercher, Wong, & Lau, 2006). As public transport users, tourists are also different from the local users and thus require specifically customised services (Thompson, 2004). However, although there have been a slow growth in studies on tourism transport (Duval, 2007), little has been discovered regarding the visitor's use of public transport at urban destinations. Tourists' use of public transport, their demand, expectations, and perceptions of the services have not yet been fully examined.

The need for a study of how tourists use public transport at an urban destination is justified by several arguments. Transport is an important element of the tourism system and a topic of extensive discussion in tourism research, especially with regards to transport to and from destinations (Cohen, Higham, Peeters, & Gössling, 2014; Scott et al., 2012). Nonetheless, transport has not been well-examined in the context of a destination (Lew & McKercher, 2006; Prideaux, 2000). Transport infrastructure plays a key role in destination development (Duval, 2007; Page, 2005; Prideaux, 2000). Therefore, sustainable transport is essential for sustainable tourism (Filimonau et al., 2014). Encouraging a modal shift to public transport is an important content of sustainable mobility. However, for a successful implementation, proactive and effective management is needed, which in turn requires strong knowledge of visitors' behaviours and attitudes. From the destination management perspective, encouraging more travel by public transport and less travel by car lowers pollution, reduces congestion problems, and decreases energy consumption, which subsequently contributes to sustainable development of the destination. From the tourist perspective, destination features including transport infrastructure are important factors in destination choice (Ashworth & Page, 2011; Khadaroo & Seetanah, 2007). Improving public transport services is important for the attractiveness of a destination. An excellent public transport system facilitates tourist mobility, contributes to provide better tourist experiences, and consequently benefits the tourism economy (Mandeno, 2011; Yang, 2010). For the public transport operators, more passengers mean more income generated.

In summary, public transport plays an important role in sustainable urban tourism. It is critical, therefore, to understand how tourists use public transport so that policies and marketing strategies for modal shift could be developed. Munich as a major tourism city in Germany with a well-established public transport network system, provides an excellent context for a study of tourist use of public transport at an urban destination.

1.2 RESEARCH CONTEXT

1.2.1 TOURISM IN MUNICH

Munich is a city located in southern Germany and is the country's third largest city (after Berlin and Hamburg). As the capital of the state of Bavaria, Munich is a commercial, industrial and cultural centre and also a major tourist gateway to the Bavarian mountainous areas. Tourists visit Munich for its long history and rich culture as well as its several arts museums and historical sites. Munich offers tourists several interesting activities such as shopping, attending concerts and festivals, and visiting museums. The city also provides tourists with easy access to the Alps mountains with impressive landscape and opportunities for sports. The number of tourist arrivals in Munich has been increasing over the last years and reached 6.3 million visitors in 2013 (Table 1). Domestic tourists account for slightly more than half of the total tourists in Munich, however, international tourists are also an important segment. In 2013, Munich received 2.86 million international tourist arrivals and 6.33 million overnight stays by foreign visitors, only second to Berlin (GNTB, 2014). However, as with most other tourist cities, Munich experiences high and low seasons. One of the busiest periods is during Oktoberfest, when millions of tourists gather to celebrate the world's largest beer festival. In 2012 for example, 6.4 million visitors were recorded in the period from 22/9-7/10 (City of Munich, 2013), causing enormous stress for transport in the city. To accommodate the large and increasing inflow of tourists, having an efficient public transport system is therefore of high importance to the city.

Table 1: Tourist arrivals in Munich from 2010-2013

	2010		2011		2012		2013	
	Count	%	Count	%	Count	%	Count	%
Domestic	3,131,210	56.20	3,376,697	56.93	3,375,014	55.03	3,444,616	54.65
International	2,440,068	43.80	2,554,355	43.07	2,757,772	44.97	2,858,338	45.35
Total	5,571,278	100.00	5,931,052	100.00	6,132,786	100.00	6,302,954	100.00

Source: City of Munich (2014)

1.2.2 PUBLIC TRANSPORT IN MUNICH

Munich has a well-developed and extensive traffic and public transport network. The public transport systems in Munich include 442km of S-Bahn

(suburban trains), 95km of U-Bahn (underground trains), 79km tram and 454km of local bus route. The systems are operated by different organizations under the supervision of the Munich Transport and Tariff Association (MVV – Münchner Verkehrs- und Tarifverbund). Given the increasing number of tourists to the city, some initiatives have been made to promote the use of public transport by the visitors. The CityTourCard was first introduced in 2007, targeting the visitor group. The Card offers tourists unlimited travel on public transport plus discounts at several attractions. It comes in several varieties and prices, and can be purchased at tourist centres, ticket vending machine, MVV customer centres, and through MVV partners. Despite being widely distributed, the CityTourCard has not been popular among tourists. In 2011, 70,417 tickets were sold, accounting for only 1.2% the total tourist arrivals in Munich that year (personal communication with MVV Marketing Director). This number does not reflect how many tourists actually use public transport in Munich. However, it suggests that more efficient tourist-oriented marketing strategies are needed to promote public transport in Munich.

1.3 THEORETICAL FRAMEWORK

Consumers' decision-making is a complex process and is influenced by several factors. Factors affecting consumer buying behaviour are generally categorised into (1) consumer characteristics, (2) product characteristics, and (3) situational context (Peter & Olson, 2009). Similarly, in the case of tourist as a consumer, factors influence the purchasing process are tourist characteristics (e.g. demographic, social and psychological factors), characteristics of the object (e.g. destination or activity), and the external factors (e.g. environmental factors, marketing, and other influences) (Fesenmaier & Jeng, 2000; Jeng & Fesenmaier, 2002). Several tourists' decision-making models have been proposed in the literature, however, most of these models examine tourists' choice of destination (e.g. Hsu, Tsai, & Wu, 2009; Nicolau & Más, 2008; Seddighi & Theocharous, 2002; Smallman & Moore, 2010; Um & Crompton, 1990). Transport mode is an important component of the tourists' travel choice (Dellaert, Ettema, & Lindh, 1998), yet little has been explored about how

tourists make their decisions regarding which transport mode to use at destinations (Masiero & Zoltan, 2013). With inputs from the abovementioned studies on tourists' decision-making, a theoretical framework of tourists' choice of transport mode is proposed as shown in Figure 1.

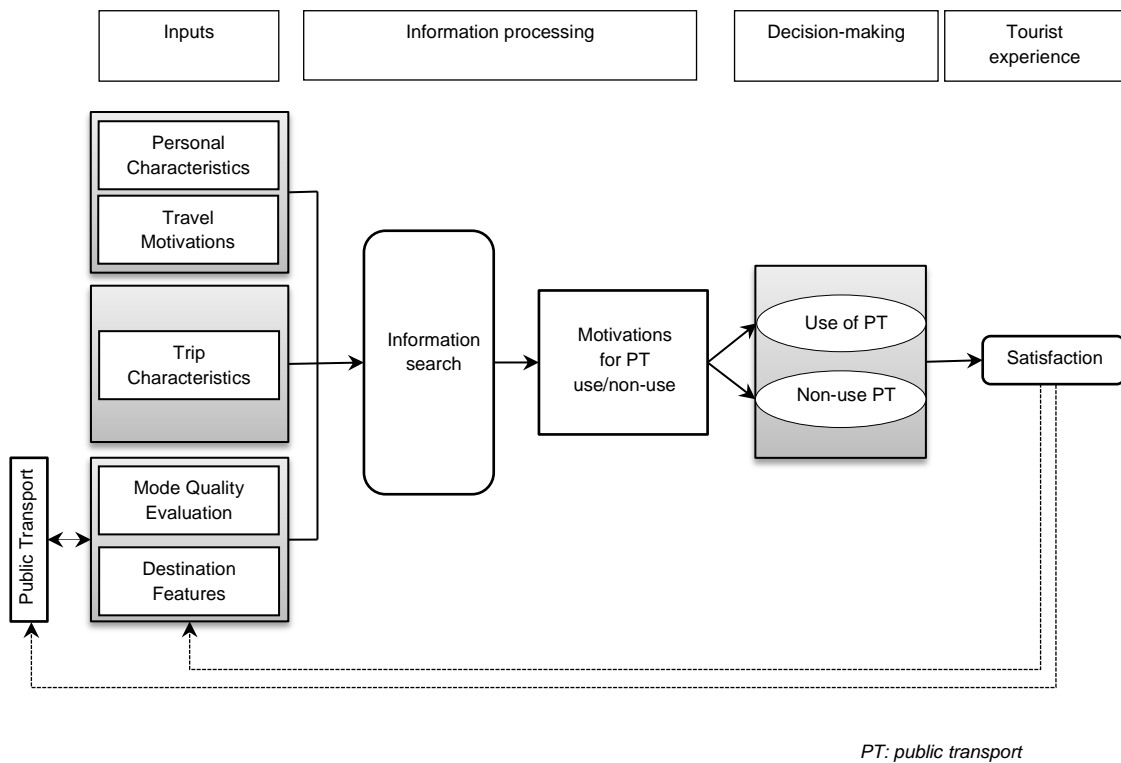


Figure 1: Proposed theoretical framework - Tourists' transport mode choice model

As a part of tourists' travel planning, transport mode choice is a sequential, multi-facet, and multistage process (Fesenmaier & Jeng, 2000; Jeng & Fesenmaier, 2002). Several factors influences tourists' transport mode choice, namely (1) personal characteristics, (2) trip characteristics, (3) destination features, (4) travel motivations, and (5) mode quality evaluation (Hergesell & Dickinger, 2013; Koo, Wu, & Dwyer, 2010; Lawson et al., 2011; Masiero & Zoltan, 2013; Vo, 2013). The personal characteristics and travel motivational factors represents "tourist characteristics", mode quality and destination features represents "product characteristics", and trip characteristics reflects the "situational context" (Peter & Olson, 2009).

Travel planning is a sequential process, thus decisions made in earlier stages considered to be more important than those made later (Bansal & Eiselt, 2004; Fesenmaier & Jeng, 2000; Jeng & Fesenmaier, 2002). It is critical, therefore, to know when a tourist makes his/her decision on the transport mode so as to understand how important the mode choice is in tourists' travel planning. Motivation is an important concept and is the driving force behind tourist behaviour (Fodness, 1994). Tourists may or may not use public transport for several reasons. Knowledge of tourists' motivations for public transport use and non-use is necessary to understand tourist transport behaviour. Finally, to provide tourists with better experiences, transport providers need to be aware of how tourists perceive their services. Measuring tourist satisfaction with public transport services is needed to provide feedback for public transport operators for service improvement. Transport infrastructure (including public transport systems) as a component of the destination features, plays an important role in destination attractiveness (Ashworth & Page, 2011; Khadaroo & Seetanah, 2007, 2008). Therefore, an improved public transport system influences the destination attractiveness to tourists and enhances tourists' mode quality evaluation, consequently affects tourists' transport mode choice.

1.4 RESEARCH QUESTIONS AND OBJECTIVES

Based on the theoretical framework described above, this dissertation examines how tourists select and use public transport while travelling at destinations, with an example of visitors in the city of Munich, Germany. Five main research questions (with sub-questions) are addressed in this study.

Research Question 1 (RQ1): What are the factors influencing tourist choice of transport mode in Munich?

- What are the factors influencing tourists' decision to use public transport in Munich?
- Are tourist choices of transport mode and areas visited in the Munich region interrelated?

Research Question 2 (RQ2): Which tourists are the public transport users and non-users at destinations?

- How do tourists use public transport at destinations (e.g. trip purposes, tickets used, activities)?
- What differentiates a public transport user and non-user?

Research Question 3 (RQ3): What motivates tourists to use public transport in Munich?

- What are the motivations for tourists to use or not to use public transport?

Research Question 4 (RQ4): How satisfied are tourists with public transport in Munich?

- What are the most important attributes determining visitor satisfaction with public transport?

Research Question 5 (RQ5): How should tourist use of public transport at destinations be encouraged?

The key research questions are examined in five papers, which are linked together under the theme “tourism and public transport” as shown in Figure 2. Addressing the five main research questions is necessary to achieve the overall aim of this dissertation – to identify appropriate strategies to encourage public transport use at tourist destinations. The specific objectives of this dissertation are:

- (1) to understand the visitor choice of transport mode and its link to areas visited in the Munich region,
- (2) to identify the characteristics of the tourist users and non-users of public transport,
- (3) to understand the visitor motivations for public transport use and non-use,

- (4) to understand how satisfied tourists are with public transport in Munich and which factors influence their satisfaction, and
- (5) to recommend strategies and policies for promoting the use of public transport by visitor at destinations.

Three subprojects were designed to achieve the research aims. Subproject 1 (overview of tourist use of public transport at destinations) is a literature review, which provides a theoretical background for addressing research question RQ1-5, and the results are presented in Paper I. Subproject 2 (Survey A: tourist choice of transport mode and areas visited in the Munich region) is an empirical study examining question RQ2 with results presented in Paper II. The third subproject (Survey B: tourist use of public transport in Munich) seeks answers to questions RQ3, RQ4, and RQ5 and the results are given in Paper III, IV, and V.

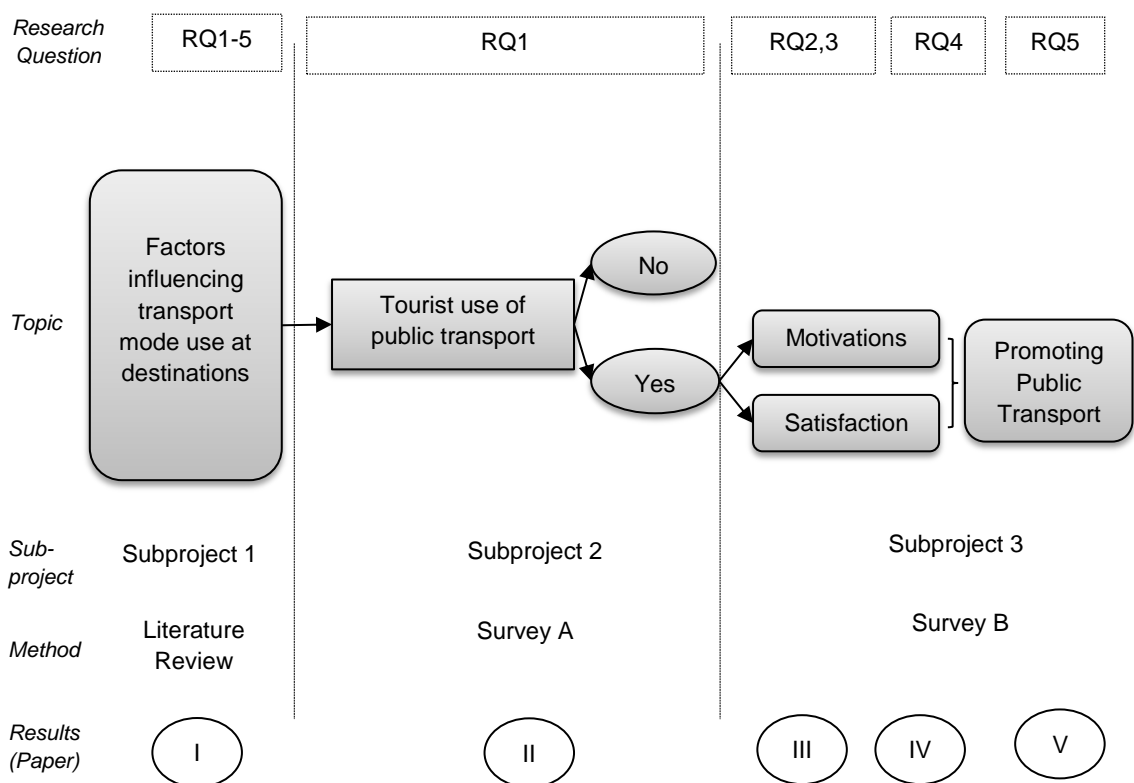


Figure 2: Structure of the research project

1.5 STRUCTURE OF THE DISSERTATION

The dissertation presents the research project examining tourist use of public transport in Munich. It consists of an introductory part, followed by copies of the three published papers, one accepted paper, and one submitted manuscript. The introductory part is organised in five chapters. Chapter 1 provides a background of the entire research project. Chapter 2 explains the main terminologies, and Chapter 3 describes the methods used throughout the research project. In Chapter 4, the main findings are summarised. The final chapter (Chapter 5) includes a discussion of the research findings. It highlights the contribution of the study to the field of tourism and public transport. Recommendations for policy-makers and implications for future research are also included.

2. KEY TERMS AND CONCEPTS

The dissertation is built upon the theoretical foundation of two research fields: transport and tourism. Due to the interdisciplinary nature of the research, key terms and concepts need to be defined for consistency. This chapter explains the key terms and concepts used in the dissertation.

2.1 SUSTAINABLE TOURISM

Since its first emerge in the 1970s, the term “sustainable development” has carried multiple definitions and interpretations (Lélé, 1991). However, most authors referred to the concept developed by the World Commission on Environment and Development (WCED) in the report *Our Common Future*. Sustainable development is defined as the “development that meets the needs of the presents without compromising the ability of the future generations to meet their own needs” (WCED, 1987).

As part of sustainable development, sustainable tourism is defined as a type of tourism that “takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment, and host communities” (UNWTO, 2014). Although the term is

ambiguous (Butler, 1999), the ultimate aims of sustainable tourism are understood as mitigating the negative impacts of tourism, while ensuring the positive experience of the stakeholders (i.e. the tourists, the communities, and the involved industries). Sustainable tourism development involves multiple aspects; however, as transport generates most of the environmental impacts from tourism, primarily with respect to emissions and biological transfer (Hall, 2011), sustainable tourism must be linked to sustainable mobility (Høyer, 2000).

2.2 SUSTAINABLE MOBILITY

Sustainable development covers many aspects including mobility. Therefore, sustainable mobility is a type of mobility that satisfies the requirements of sustainable development. The thesis adopts the concept of sustainable mobility developed by the mobil.LAB Doctoral Research Group as follows (mobil.LAB, 2014):

“Sustainable mobility ensures the individual fulfilment of basic needs and activities without harming the environment, economy or society, whether now or in the future. This requires affordable accesses to multiple mobility options, freedom of choice in terms of mode and access to life opportunities. Sustainable mobility, however, does not and should not require a reduction in mobility. Instead, it should be safe for all users and therefore minimise any type of negative effects on individuals, communities, the private sector and the environment.

Achieving sustainable mobility is an ongoing, complex and open-ended process of deliberation, participation, experimentation and collective learning. As a framework, sustainable mobility should orient leaders, experts, the private sector, civil society and individuals in better understanding current problems and the range of solutions available. It should also provide a framework for decisions concerning the transport and mobility sector, whether initiated in the private or public sector. Sustainable solutions should be innovative, in that they consider

developments in technology alongside the societal and environmental impacts of use.”

2.3 PUBLIC TRANSPORT

Public transport plays an important role in urban planning and destination development, as encouraging a modal shift is vital to achieve sustainable mobility (Banister, 2008). Public transport (or public transportation, mass transit, public transit) refers to rail, bus, scheduled ferries, taxicab, and other systems that transport the public members (UITP, 2013). In this study, public transport is defined as the use of shared, and often state operated or contracted, bus, tram, and train transport available for use by the general public including tourists to move around an area, excluding transport on city tour buses.

Public transport has several advantages over other engine-powered modes of transport (e.g. lower cost for passengers, less space for the cities, safer and more energy-efficient) (APTA, 2013; UITP, 2013) and, therefore, is often viewed as a more sustainable mode of transport as opposed to the private car (Holmgren, 2007).

2.4 VISITOR/ TOURIST/ EXCURSIONIST

The subject of the dissertation is the visitor/ tourist/ excursionist in Munich. Based on the definitions by World Tourism Organisation (UNWTO, 2013), the term *visitor* refers to those having a trip to Munich for less than a year for any main purpose (e.g. business, leisure, or other personal purposes) except those employed by a local entity. Visitors include “tourists” and “excursionists”, which are differentiated by length of stay. A tourist is a visitor that has an overnight stay at the destination, whereas an excursionist is on a one-day trip. In the dissertation, the two terms *tourist(s)* and *visitor(s)* are used interchangeably while the term *excursionist(s)*, also known as *day-trippers*, is used for single-day, non-overnight visitors in Munich. The term *visitor-users* of public transport in the dissertation refers to the visitors and tourists who use public transport for travelling at destinations.

2.5 DESTINATION

A destination is a key concept in tourism yet there is no single widely accepted definition (Hall, 2008). According to UNWTO (2007), a tourism destination is a physical space, which has all the services and infrastructure necessary to accommodate the tourism industry. Destinations could be on any scale, ranging from a whole country, region, city, town, and village to a self-contained centre. In this dissertation, the term is used to broadly refer to the places where tourists visit, which could be a region, a town, a city, or a village.

2.6 THE MUNICH REGION

The particular destination examined in this dissertation is the city of Munich and its surrounding areas and attractions, simply referred to as “the Munich region”. In Subproject 1, respondents were asked to indicate their modes used and areas visited during the time they stayed in Munich. Valid areas visited were limited to nearby towns, cities, and attractions which could be easily reached on a day trip. In Subproject 2, tourists were specifically asked about their experience with public transport system in the city of Munich and suburban areas. Specifically, the public transport network by the Munich Transport and Tariff Association was evaluated by tourists.

3. METHODS

3.1 OVERVIEW

The previous chapters presented the research questions, the key terms, and concepts of the dissertation. To gather the best results for the research questions, it is crucial to have suitable research methods. This chapter describes the study methodology. It first outlines the general scientific approach of the dissertation and follows with details of the methods used in each study. Additionally, methodological limitations are acknowledged at the end of the chapter.

The way a researcher conducts the research is influenced by her beliefs, perceptions, and interpretations of the surroundings. As researchers are very

different from each other, there are also a variety of approaches to one solution. However, there is always a general belief system or theoretical framework that guides the researcher, which is referred to as the research paradigm or worldview (Creswell, 2014). Selecting a paradigm as the first step of conducting research is important as this will establish the research objectives, methodology, and expectations (Mackenzie & Knipe, 2006). The most widely discussed paradigms in the literature are positivism/postpositivism, constructivism, transformative, and pragmatism (Creswell, 2014). According to Guba (1990, p.18), answers to the three following basic questions form the characteristics of the paradigm that might be adopted:

1. *Ontological*: What is the nature of “knowable” (or “reality”)?
2. *Epistemological*: What is the nature of the relationship between the knower (the inquirer) and the known (or knowable)?
3. *Methodological*: How should the inquirer go about finding out knowledge?

Figure 3 illustrates the nature of this study characterised by answers to the three questions above. Tourist use of public transport, as part of tourist behaviour in particular and consumer behaviour in general, has certain patterns and thus can be generalised. Due to the complexity of human behaviour, it is uncertain how much the absolutely perfect reality has been uncovered. Findings of this study can only represent reality imperfectly. Nonetheless, the results are still relevant for tourism and transport management and can be used by tourism researchers and practitioners in understanding tourist public transport behaviour. Therefore, the ontology of this study is *critical realist*, which is the basis of postpositivism (Guba, 1990). Epistemologically, the researcher and the research subjects are independent from each other (*dualist*), yet it is recognised that *objectivity* cannot be retained in absolute sense, but only reasonably closely. One way to increase objectivity is to send and present the research concepts and results in various forms (e.g. papers and presentations) to peer-reviewed journals and conferences so that different views (i.e. from the feedback provided) can be included in the research process. Methodologically,

quantitative research methods are often used for research on transport passenger and tourist behaviour (e.g. Bansal & Eiselt, 2004; Dallen, 2007; Fellesson & Friman, 2008; Kinsella & Caulfield, 2011) and thus were deployed in this study.

Based on the nature of the research questions and subjects, this study embraces a postpositivism research paradigm, which emphasises the *critical reality* and the *modified objectivist* approach to studying social phenomena. This theory also gives importance to *quantitative research methods* such as surveys, experiments, and quasi-experiments. These methods have an advantage of being able to generate a large number of cases in a relatively short time and the results have a high degree of generalizability.

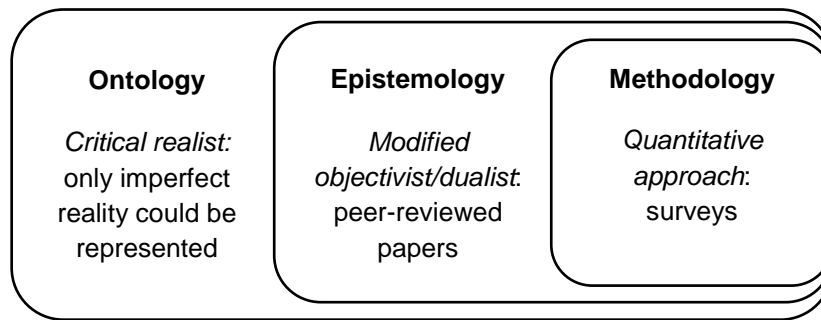


Figure 3: The dissertation’s research paradigm

Three studies were conducted to address the main research questions of this dissertation, each of which has its own specific research objectives and questions. The first study aims to provide a state-of-the-art literature review on the topic of tourist use of public transport at destinations. The other two subprojects were to provide empirical data (from surveys) for the dissertation. Survey A aims to analyse the visitor’s choice of transport mode and areas visited in the Munich region. The main purpose of Survey B was to examine the visitor motivations for use and satisfaction with public transport in Munich. Results from these subprojects were presented in five papers using different methods of analysis (Table 2). The following sections explain the methodological background of the papers.

Table 2: Data collection and analysis methods

	Data Collection	Data Analysis
Paper I Tourist use of public transport at destinations – A review	Desk Research: Articles and conference papers on tourism and public transport at destinations	Content analysis
Paper II Modelling tourist choice of transport mode and areas visited at destinations	On-site survey: Questionnaires collected from Survey A	Bivariate probit regression Univariate probit regression
Paper III Visitor users vs. non-users of public transport: The case of Munich, Germany	On-site survey: Questionnaires collected from Survey B	Factor analysis Discriminant Function Analysis Chi square Test Mann-Whitney U Test
Paper IV Analysis of visitors' satisfaction with public transport in Munich	On-site survey: Questionnaires collected from Survey B	Factor analysis Discriminant Function Analysis Spearman Test
Paper V Promoting public transport use in tourism	Results from Paper III and IV	Descriptive Content analysis

3.2 SUBPROJECT 1 – LITERATURE REVIEW: OVERVIEW OF TOURIST USE OF PUBLIC TRANSPORT AT DESTINATIONS

The literature review seeks to provide an overview of research on visitor use of public transport at destinations and to set up a solid background and context for the whole research project. The review started at the beginning of the project and was continuously updated throughout the course of the study. The review results were used for two main purposes:

- (1) to provide a theoretical background for the empirical studies, and
- (2) to provide an extensive review paper on its own.

The literature review was assisted by use of three databases: Web of Science, Scopus, and Google Scholar. The main keywords for literature search are the

concepts explained in the previous chapter, and were modified in different stages, depending on specific requirements of the topics. The final literature search for the review paper was conducted on 21 January 2014 on Scopus platform with the keywords being ["public transport" or "public transit" or "public transportation" OR "bus" OR "rail" OR "train" AND tourism OR tourist OR visitor OR leisure AND destinations OR city OR cities OR urban OR rural OR metropolitan]. The search resulted in 381 items whose abstracts were reviewed and from which over 100 articles were included for the analysis in the paper. Results from the literature study were used for a standalone review paper (Paper I) and as background for the original research papers (Paper II-V).

3.3 SUBPROJECT 2 – SURVEY A: TOURIST CHOICE OF TRANSPORT MODE USE AND AREAS VISITED IN THE MUNICH REGION

The second subproject was designed to examine visitors' transport mode choice and areas visited during their trip in Munich. Its two main aims are (1) to identify the factors influencing visitor choices of public transport and areas visited, and (2) to determine if these two choices are related.

3.3.1 QUESTIONNAIRE DEVELOPMENT

The questionnaire consists of 20 closed-ended questions, which were developed with reference to related previous studies (e.g. Koo, Wu, & Dwyer, 2010; Koo, Wu, & Dwyer, 2012; Masiero & Zoltan, 2013; Vo, 2013). The three A4 pages questionnaire was organised in four parts:

- Section A (question 1-8): visitors' trip information,
- Section B (question 9): transport mode quality evaluation,
- Section C (question 10-13): visitors' transport mode choices and places visited in the Munich region, and
- Section D (14-20): respondents' social and demographic information.

3.3.2 SAMPLE AND SURVEY SITE SELECTION

To capture accurate information on which modes tourists actually used and places they visited during their trips in Munich, it was decided that the data was to be collected at arrival/departure points in Munich. The main transport modes for leisure travelling to and within Germany are car, plane, train, and

coach. For example, of 42.7 million trips from other European countries to Germany in 2011, 49% were made by car, 30% by plane, 15% by coach and train, and only 6% by other modes (GNTB, 2012). However, due to time and cost constraints in locating and approaching tourists travelling by car, this group was removed from the sample. Consequently, only the central train station, central bus station, and airport were selected as study sites. As there is no available information on tourists' mode of departure or mode of arrival in Munich, an equal portion (1:1:1) was assumed. Therefore, the same numbers of questionnaires were purposefully collected at each of these three sites.

3.3.3 PILOT TESTS

The questionnaires were tested during three pilot tests among (1) multicultural background students at a German class, (2) tourists at the Pinakothek Museums and the Munich Residence, and (3) tourists at the central train station. The final questionnaire version incorporated all changes regarding content and format, and was made available in German, English, Spanish, and Chinese.

3.3.4 MAIN SURVEY

The survey was carried out at the Munich Airport (München Flughafen), Munich Central Train Station (Hauptbahnhof), and Munich Central Bus Station (Zentraler Omnibusbahnhof) from 1 November to 14 December 2013. The researcher and two survey assistants, who were thoroughly trained in the interview procedure, approached passengers, introduced themselves, and invited passengers to participate in the survey. Passengers were then asked if they were tourists completing their trip in Munich. Questionnaires were given to qualified respondents to be filled out and returned on the spot. Two survey assistants standing nearby readily assisted the respondents if they had any questions. A map of the public transport network showing the city zones and attractions was attached to the questionnaire. Intercept points were the departure lounge at the airport (both Schengen and non-Schengen areas), train platforms at the train station, and bus departure area at the bus station. In total, 515 questionnaires were collected at three sites. However, 37 were removed from the analysis due to reasons such as respondents lived near to Munich and

commuted to work, respondents were transit passengers, or respondents did not visit Munich city. Four random questionnaires were also removed from those collected at the bus station to ensure the consistent number of respondents between three sites. The final sample consists of 474 questionnaires (158 for each site).

3.3.5 DATA ANALYSIS

- Discrete Choice Modelling

Discrete choice modelling is an analytical method that uses econometric models to predict an individual's choice between two or more discrete alternatives. The method deals with qualitative choice behaviour in finite discrete choice situations and is widely applied in transportation research (Ben-Akiva & Lerman, 1985; Domencich & McFadden, 1975; Koppelman & Bhat, 2006). In tourism research, discrete choice analysis is recognised as an effective method to determine the trade-offs a tourist is willing to make when given different alternatives (Baltas, 2007). It is often used to forecast tourism and travel demand, especially with regards to destination and mode choice (e.g. Koo et al., 2010; LaMondia, Snell, & Bhat, 2010; Pettebone et al., 2011; Vo, 2013).

- Random Utility Theory

Discrete choice models are based upon the Random Utility Theory. Utility is an economic indicator of the values perceived by a consumer of a particular good or service. In discrete choice analysis, an individual makes one single choice among a set of mutually exclusive and collectively exhaustive alternatives (Ben-Akiva & Lerman, 1985). Under the utility maximisation rule, a person i would choose an alternative k if he or she could obtain the greatest utility from k than from any other alternatives in the choice set:

$$U_{ik} > U_{ik'} \quad \forall k' \neq k$$

Utility of a (tourism) product is affected by several factors; however not all can be observed. Therefore utility U_{ik} is assumed to be composed of a deterministic

component V_{ik} , which is related to the alternatives and can be measured, and an error component ε_{ik} , which cannot be measured:

$$U_{ik} = V_{ik} + \varepsilon_{ik}$$

To estimate the random component, probabilities are used to express the choice behaviour. Therefore, the probability that an individual i would choose an alternative k is the probability that the utility of k exceeds that of any of the alternatives in the choice set:

$$P_{ik} = Pr [U_{ik} > U_{ik'} \quad \forall k' \neq k]$$

$$P_{ik} = Pr [V_{ik} + \varepsilon_{ik} > V_{ik'} + \varepsilon_{ik'} \quad \forall k' \neq k]$$

In this study, the visitor mode choice decision-making (Model 1) is explained by a random utility function:

$$U_{ik} = \beta' X_{ik} + \varepsilon_{ik}$$

where U_{ik} is the utility that tourist i obtains from mode k , β' is a vector of coefficients, X_{ik} is a set explanatory variables influencing the possibility of choosing mode k as perceived by tourist i , and ε_{ik} is the unobserved random component of utility. A tourist would choose public transport over other modes, if it yields the highest utility, i.e. $U_{i,PT} > U_{i,Non-PT}$, where PT stands for public transport.

Econometrically, a binary choice variable was observed:

$$y_{i(MODE)} = y_{i1} \begin{cases} 1, & \text{if tourist } i \text{ uses public transport} \\ 0, & \text{if tourist } i \text{ does not use public transport} \end{cases}$$

To examine the effects of other factors on public transport choice, a reduced-form model is used:

$$y_{i1} = f(\beta_1' X_{i1}) \quad (1)$$

where i indexes individuals, X is a vector of control variables, and β' are parameters to be estimated.

A similar model (i.e. Model 2) is applied for the dependent variable “areas visited” with the variable defined as:

$$y_{i(AREA)} = y_{i2} \begin{cases} 1, & \text{if tourist } i \text{ only visits Munich city} \\ 0, & \text{if tourist } i \text{ visits Munich city and beyond} \end{cases}$$

$$y_{i2} = f(\beta'_2 X_{i2}) \quad (2)$$

Since y_i is a binary variable, Equation (1) and (2) were estimated using a probit specification.

- Probit regression

Binary probit is a common binary choice model, which has been applied in several fields (Ben-Akiva & Lerman, 1985). The model is specified based on a latent variable model, in which the error term ε_i is assumed to follow a normal distribution. For simplicity, the second subscript on the variables was dropped.

$$\begin{aligned} Pr(y_i = 1 | X) &= Pr(y_i^* > 0) \\ &= Pr(\beta' X_i + \varepsilon_i > 0) \\ &= Pr(\varepsilon_i > -\beta' X_i) \\ &= Pr(\varepsilon_i < \beta' X_i) \\ &= \Phi(\beta' X_i) \\ &= \int_{-\infty}^{\beta' X_i} \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2} \varepsilon_i^2\right) d\varepsilon_i \\ Pr(y_i = 0 | X) &= 1 - \int_{-\infty}^{\beta' X_i} \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2} \varepsilon_i^2\right) d\varepsilon_i \end{aligned}$$

where Φ is the cumulative distribution function (CDF) of the standard normal distribution and the parameters β are typically estimated by the maximum likelihood.

- The bivariate probit regression

To examine the interdependency of two variables, a bivariate probit regression

is often adopted (e.g. Castillo-Manzano, 2010; Masiero & Zoltan, 2013). In bivariate probit model, the two independent variables are influenced by the same set of factors and are correlated. In this study, the bivariate model is a joint model of Equation (1) and Equation (2) in which the two latent variables y_{i1}^* and y_{i2}^* may be correlated. The interdependency of the two variables is measured by a correlation coefficient ρ of the two error terms ε_{i1} and ε_{i2} . If the coefficient ρ is significant, the two latent variables are correlated and should be estimated simultaneously. An insignificant ρ is evidence that the two latent variables are not significantly correlated and thus (1) and (2) can be estimated by separate probit models, which was the case in this study.

3.4 SUBPROJECT 3 – SURVEY B: TOURIST USE OF PUBLIC TRANSPORT IN MUNICH

The third subproject of this dissertation examines how visitors use public transport in Munich. This study has two main objectives: first, to discover the visitor motivations for public transport use and non-use; and second, to measure visitor satisfaction with public transport and identify the factors influencing satisfaction. Data were collected from a self-completed questionnaire-based survey.

3.4.1 QUESTIONNAIRE DEVELOPMENT

The questionnaire consists of 29 questions in which most (28) are closed-questions. Among the structured questions, six have 5-point Likert-scaled response options, ranging from 1 (minimum score) to 5 (maximum score). The Likert-scaled questions were used to measure: (1) motivations for using or not using public transport in Munich, (2) importance of information, and (3) satisfaction with public transport services. The motivational statements were developed with inputs from previous related studies (e.g. Coleman, 1997; Stradling, Carreno, Rye, & Noble, 2007; Thompson & Schofield, 2007) as well as from informal sources. The questionnaire was laid out in four A4 size pages, and arranged in four sections:

- Part A (question 1-7): tourists' trip characteristics,
- Part B (question 8-16): tourists' use of public transport in Munich,
- Part C (question 17-21): tourists' satisfaction with public transport in Munich, and
- Part D (question 22-29): respondents' personal information.

The questionnaires were made available in three languages: English, German, and Italian.

3.4.2 SAMPLE AND SURVEY SITE SELECTION

Respondents were recruited using an intercept approach. The survey assistants approached the tourists near the entrance of the attraction, introducing themselves, briefly outlining the research project, and inviting the tourists to participate in the survey. Questionnaires were then handed out to those who had agreed to take part. In order to generate the largest number possible of respondents, the survey was carried out at popular tourist sites in Munich: the English Garden, the Munich Residence, and the Pinakothek Museums (Alte, Neue and Moderne). The three survey assistants divided their time between these sites.

3.4.3 PILOT TESTS

Two pilot tests were done in March 2012. The first one included a group of exchange students at the Technische Universität München, who participated in a German class. The second one was carried out with tourists at the Neue Pinakothek. Feedback from the respondents showed that most questions were correctly understood and answered. Revisions of the questionnaire however were needed to improve the clarity of the questions while additional information and ideas were added where suitable.

3.4.4 MAIN SURVEY

Following the pilot tests, the main survey was conducted in April and May 2012. Overall, 2481 people were approached and about 500 questionnaires were distributed (to those who agreed to participate in the survey). Out of 483 questionnaires collected, 466 were usable, 17 were rejected as either the

questionnaire was not properly completed, most of the important questions were skipped, or the respondents were not considered as tourists.

3.4.5 DATA ANALYSIS

- Factor Analysis

Visitors were asked to rate their reasons for public transport use and non-use on a list of 20 and 15 motivational statements respectively. To identify the underlying dimensions of the tourist motivations for using or not using public transport in Munich, an explanatory factor analysis was used (Thompson & Schofield, 2007).

In this study, factor analysis was run by *IBM SPSS Statistics 21* with Principle Component Analysis as the factor extraction method and Varimax orthogonal rotation as the factor rotation method. The goal of principal components technique is to maximise variance extracted by orthogonal components (Tabachnick & Fidell, 2007). Varimax is a common rotation method and has been well recognised for generating the most interpretable results (Field, 2013; Malhotra, 2007; Robson, 1993; Tabachnick & Fidell, 2007). This method aims to simplify factors by maximising the variance of the loadings within factors, thus producing factors that are uncorrelated and have a factor structure in which each variable loads highly on one factor only. Factor loading indicates the correlation of each original variable and the factor. Variables with higher loadings are more representative for the factor. Factor loadings of at least 0.5 are considered significant (Hair, Anderson, Tatham, & Black, 1998), and thus in this study factors with loadings lower than 0.5 were removed from the analysis. The number of factors retained was decided according to the Kaiser criterion (all factors with eigenvalues greater than one) (Field, 2013; Hair et al., 1998; Sharma, 1996). Eigenvalue represents the amount of standardised variance in the variable accounted for by a factor. To test the correlation between variables constituting one factor, reliability analysis (Cronbach's alpha) was used.

Data used in this dissertation meet the requirement of the sample to variable ratio 1:5 for factor analysis (Hair et al., 1998). The Bartlett's Test of Sphericity is

significant at $p=0.000$ and Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (KMO >0.5) confirm the suitability of data for factor analysis (Hair et al., 1998; Sharma, 1996). In particular, factor analyses (FA) were used for the following studies:

- (1) FA 1: to identify the visitors' reasons for visiting Munich (Paper II)

Sample size 474, number of variables 10, two factors solution.

Table 3: KMO and Bartlett's Test of FA1

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.855
Bartlett's Test of Sphericity	Approx. Chi-Square	1309.445
	df	45
	Sig.	.000

- (2) FA 2: to delineate the underlying motivational factors for visitor public transport use (Paper III)

Sample size 380, number of variables 20, four factors solution.

Table 4: KMO and Bartlett's Test of FA2

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.696
Bartlett's Test of Sphericity	Approx. Chi-Square	856.159
	df	153
	Sig.	.000

- (3) FA 3: to delineate the underlying motivational factors for visitor public transport non-use (Paper III)

Sample size 86, number of variables 15, four factors solution.

Table 5: KMO and Bartlett's Test of FA3

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.751
Bartlett's Test of Sphericity	Approx. Chi-Square	389.237
	df	91
	Sig.	.000

(4) FA 4: to identify the main public transport service dimensions (Paper IV)

Sample size 466, number of variables 16, four factor solution.

Table 6: KMO and Bartlett's Test of FA4

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.874
Bartlett's Test of Sphericity	Approx. Chi-Square	2846.256
	df	120
	Sig.	.000

- Discriminant Analysis

The visitor-users of public transport in Munich differ from each other in several characteristics. However, it is interesting to know which factors are the most influential in determining a visitor-user versus a non-user of public transport. Discriminant Function Analysis (DA) was therefore used for this purpose. Discriminant Analysis is used to analyse relationships between two variables and predict group membership (Sheskin, 2007). However, unlike multiple linear regression where dependent variables have to be interval, dependent variables of DA can be categorical (e.g. public transport user and non-user) and independent variables can be interval or dichotomous. A stepwise method was adopted in this study, as this method has been proven effective in identifying predictors in previous transport studies (Fellsson & Friman, 2008; Kim & Lee, 2011). The purpose of stepwise discriminate analysis is to identify the best set of predictors among a larger number. In stepwise analysis, most often, predictor variables are entered into the analysis based on how highly they are correlated with the group variables (Sheskin, 2007). This study used SPSS's stepwise DA, in which variables were added one by one until no significant amount was added to the canonical R squared by adding extra variables (Manly, 1994).

3.5 METHODOLOGICAL LIMITATIONS

The research was thoroughly planned, designed, and conducted. Nevertheless, there are some methodological limitations that should be addressed. The first limitation lies in the characteristics of a postpositivism approach, that is a

number of human and social factors were not considered (e.g. behaviour changes, contradictory behaviour, and emotions). The data analysis was based on the information provided by respondents on the questionnaire sheets and thus interpretation of the results is limited. Further information on the visitors' personal background and detailed individual interpretation from focus group or interviews would have provided insights for the analysis. Second, the use of self-completed questionnaire-based surveys, though very cost- and time-effective, has certain disadvantages that may affect the findings. Some questions may have been misunderstood by respondents and consequently, inaccurate information was given. Third, survey sites were limited to only the city centres and transport hubs in Munich. Additional data from suburban or nearby remote areas would have made the picture of visitor use of public transport more complete. Furthermore, the selection of a convenient and purposeful sample (Survey A) means that the sample was not representative for tourists in Munich as a whole. Interpretation and application of the results should therefore take these limitations into account.

4. RESULTS

As mentioned earlier, three subprojects were carried out to collect data for the research questions. Results of these studies were presented in five papers, each of which addresses specific research questions (Table 7). This section summarises the main findings and contribution of each paper. Further details on the findings can be found in the full papers included in the Appendix.

Table 7: Research questions addressed in papers

	Research questions	Paper
RQ1	What are the factors influencing tourist's choice of public transport in Munich?	I, II
RQ2	Which tourists are the public transport users and non-users at destinations?	I, III
RQ3	What motivates tourists to use public transport in Munich?	I, III
RQ4	How satisfied are tourists with public transport in Munich?	I, IV
RQ5	How should tourist use of public transport at destinations be encouraged?	I, V

4.1 PAPER I: TOURIST USE OF PUBLIC TRANSPORT AT DESTINATIONS: A REVIEW

Knowledge of how tourists use public transport at the destination is important for sustainable mobility, public transport management, and destination management. This paper provides an overview of research on public transport and tourism since 2000. Its objectives are: (1) to understand the main topics and issues regarding public transport use and tourism at destinations, (2) to understand how public transport is used for tourism purposes in different contexts, (3) to recommend the best policies and strategies for a modal shift to public transport in tourism, and (4) to identify areas and gaps for future research.

The review identifies the main topics and issues regarding how public transport is used for tourism purposes in different contexts. It indicates that there are differences in the level of public transport use by visitors between rural and urban destinations. Public transport is often not favoured by visitors in remote areas, although the situation is more promising in urban destinations. However, the overall potential of public transport as an alternative mode for travelling is unclear. Visitor mode choice is influenced by several factors. Public transport operators need to understand tourist motivations and behaviours to provide better customisation of services for this group.

Based on the review, it is suggested that information is the key factor in encouraging modal shift. Educational programs and campaigns promoting public transport should highlight the positive aspects of alternative modes. After that, it is important to provide information on existing public transport systems so that people know that they could have the option to contribute to minimising environmental impacts.

This paper provides a state-of-the-art review on research on public transport for tourism purposes at destinations. In addition to the identification of key issues and trends, the paper also suggests direction for future research including the implication of ageing populations, and the influence of income and self-identity on public transport behaviour.

This paper was accepted on 22 June 2014 for publication in *Current Issues of Tourism* (Appendix 1).

4.2 PAPER II: MODELLING TOURIST CHOICE OF TRANSPORT MODE AND AREAS VISITED AT DESTINATIONS

Tourist movement patterns and transport mode choice are important topics in tourism research. Nonetheless, little is known about how visitors at an urban destination make their decision on areas visited and transport modes used. This paper examines visitor choice of public transport and the extent of their visit in the Munich region through the use of a bivariate probit model. Its objectives are (1) to identify the factors influencing tourist's use of public transport, (2) to determine the factors influencing tourist choice of areas visited, and (3) to discover if tourist choice of transport mode and areas visited are interrelated.

Data for the study was collected from a self-completed questionnaire-based survey in November and December 2013 (Survey A), which resulted in 474 usable questionnaires. The findings show that visitor choice of transport mode and areas visited are not necessarily related and that public transport has potentially a great role in sustainable tourism. The choice of public transport as a mode of travel within the Munich region is independent from visitor residence, departure point, perception of ease-of-travel, point of time making transport mode decision, importance of time in mode evaluation, and pull factors (local attractions) for visiting Munich. In contrast, educational level, length of stay, previous visits, driving license ownership, importance of price, and push factors are significant influences on visitor mode choice. Public transport was found to be more likely to be used by well-educated, overnight visitors, who are also price-conscious. Similarly, the choice of areas visited depends on visitor residence, length of stay, previous trips, perception of ease-of-travel, and the pull factors. Visitors who travelled beyond the city of Munich to nearby areas are more likely to be overnight, returning, and international cultural visitors.

This study provides important contributions to the literature on tourist travel behaviour at a destination. It shows that an efficient public transport system

supports the dispersal of tourists and thus is vital in sustainable tourism development for an urban destination. Furthermore, understanding tourists' extent of a visit is necessary to diversify attractions, distribute income, and enhance the destination attractiveness. This paper examines if visitors use public transport and if they travel beyond the city to nearby areas. The findings are not only relevant for Munich but could also be applied for other cities of similar conditions. The measurement is straightforward and effective for a destination to identify important factors affecting the choice of public transport and extent of visit.

This paper was submitted to *Tourism Geographies* on 27 June 2014 (Appendix 2).

4.3 PAPER III: VISITOR USERS VS. NON-USERS OF PUBLIC TRANSPORT: THE CASE OF MUNICH, GERMANY

This paper examines the use of public transport by visitors in the city of Munich, Germany. Its objectives are twofold. First, it investigates the motivations for using or not using public transport. It focuses on distinctive characteristics between the users and non-users and how they are different in their demographic and travel profiles as well as their attitudes towards public transport. Second, it seeks to understand which factors influence visitor use of public transport.

Data used in this study was collected from a self-completed questionnaire-based survey in April and May 2012 (Survey B) which resulted in 466 usable questionnaires. Using factor analysis, it was found that there are a variety of reasons for visitors to use public transport in Munich, namely drive-free benefits, traffic reduction, advantages of local public transport, and car unavailability. In contrast, what often discourages public transport use are inconvenience and restrictions, lack of information, disadvantages of public transport, and personal preferences. The five most important variables that differentiate a visitor-user of public transport from a non-user are length of stay, main purpose of trip, age group, frequency of public transport use at place of residence, and valid driving license ownership. The visitor public transport

users tend to be younger people, whereas the non-users are mostly of medium to older ages. Furthermore, the users of public transport are likely to be on holiday and stay longer in Munich than the non-users.

The study highlights the importance of public transport information, and accessible and conveniently located train stations and bus stops for visitors and locals alike. A significant finding is the extent to which public transport needs to be promoted as part of strategic destination marketing. The use of social marketing techniques to influence behavioural change with respect to public transport use are therefore desirable in the pre-trip decision stage as well as at the destination.

This paper was accepted on 20 December 2013 for publication in *Journal of Destination Marketing and Management*, Volume 3, Issue 3, 2014 (Appendix 3).

4.4 PAPER IV: ANALYSIS OF VISITOR SATISFACTION WITH PUBLIC TRANSPORT IN MUNICH

Measuring customer satisfaction with public transport services is an important topic in transportation research and practice. To improve services and increase the number of passengers, providers need to understand how much customer expectations have actually been fulfilled. This paper investigates the use of public transport by visitors in the city of Munich, Germany. It seeks to understand (1) how visitors perceive public transport services in Munich and (2) which factors influence their level of satisfaction.

Data used in this paper were extracted from a survey on visitor use of public transport in Munich (Survey B). The findings show that visitor-users of public transport in Munich tend to be of younger age, well-educated, and physically healthy. They are often visitors on holiday trips and stay for at least two days in the city. Factor analysis resulted in four different service dimensions, namely travelling comfort, service quality, accessibility, and additional features. Visitors were found to be generally satisfied with public transport services in Munich and their perceptions are independent from most individual factors.

The paper has shed light on visitor satisfaction with public transport at an urban destination. Improving visitor satisfaction is critical to promote public transport use and sustainable mobility at destinations. It is recommended that marketing strategies to encourage visitor public transport use should address the most important service attributes such as information, ticket price, service frequency, space on the vehicle, cleanliness of the vehicle, and ease-of-use.

This paper was accepted on 3 July 2013 for publication in *Journal of Public Transportation*, Volume 17, Issue 3, 2014 (Appendix 4).

4.5 PAPER V: PROMOTING PUBLIC TRANSPORT USE IN TOURISM

Public transport is an essential element and plays a key role in the sustainable development of an urban destination. Tourists should be encouraged to use more public transport for travel. However, in order to promote public transport use, it is important to understand how tourists use public transport and what are particularly required by them. This paper aims to (1) identify the most important attributes of public transport services for visitors and (2) suggest directions for marketing strategies to encourage public transport use.

Based on data from the case study of visitor use of public transport in Munich (Survey B), it is suggested that initial target visitor-users of public transport are younger and well-educated visitors travelling for holiday purposes as this group of visitors is more likely to use public transport than others. However, over time other visitor market segments can be engaged, especially as marketing campaigns are developed that engage visitors and travel intermediaries with appropriate pre-trip information. As users of public transport, visitors greatly value service quality, ease-of-use, information, and price. Service improvement therefore should be the core of any marketing plan, yet it is most important to make the public transport system visitor-friendly. Transport providers should also make information widely available for visitors, especially at their preferred information channels (e.g. train stations, accommodation, tourist centres). A public transport system may be simple for the residents to use but visitors may find it problematic if they cannot read the

information on stops or trains. Finally, visitors should be motivated by different ticket categories that offer more discounts or other benefits.

This paper was accepted on 30 July 2013 for publication as a book chapter in the peer-reviewed book entitled *“Understanding and Governing Sustainable Tourism Mobility”*, edited by S. Cohen, J. Higham, P. Peeters, and S. Gössling (Appendix 5).

5. DISCUSSION AND CONCLUSIONS

The previous chapter summarises the major results of the dissertation as presented in the five annexed papers. Bringing together findings from the five papers, this chapter reviews and identifies the key findings of the dissertation as a whole. The main themes discussed include the factors affecting visitor use of public transport and the target visitor-users of public transport. Furthermore, the discussion is extended to the characteristics of an attractive public transport system for visitors, the potential of public transport as an alternative mode in tourism as well as the challenges to sustainable tourist mobility. Finally, the contributions of the dissertation to the tourism literature are highlighted and implications for further research are included.

5.1 DISCUSSION

5.1.1 FACTORS INFLUENCING TOURIST USE OF PUBLIC TRANSPORT

Transport mode choice is a complex decision-making process (Dellaert et al., 1998). In line with previous studies (e.g. Chang & Lai, 2009; Kinsella & Caulfield, 2011; Malhado & Rothfuss, 2013; Thompson & Schofield, 2007), this study confirms that tourists’ choice of transport modes, their motivations for use, and their satisfaction with the public transport services at destinations are influenced by numerous factors. Figure 4 depicts a model of tourists’ use of public transport as examined in this study. The tourists’ decision to use public transport is influenced by their educational levels, “Push” motivational factors for visiting Munich, length of stay in Munich, number of previous trips to Munich, importance of price in mode quality evaluation, and ownership of a

valid driving license (Paper II). Transport mode tends to play a recognised role in tourists' decision-making as most tourists made their decision on transport mode choice before the trips to Munich (Paper II). Obtaining public transport information is important for tourists and the most common information channels are train stations, the Internet, word-of-mouth, accommodations, and tourist centres (Paper V). Tourists use public transport for motivations such as drive-free benefits, traffic reduction, advantages of local public transport, and car unavailability. On the other hand, reasons for public transport non-use are inconvenience and restrictions, lack of information, disadvantages of public transport, and personal preferences (Paper III). In general, tourists were relatively satisfied with the public transport services in Munich. However, improvements on some service aspects are recommended, especially on the important attributes such as information, ticket price, service frequency, ease-of-use, cleanliness of the vehicle, and space on the vehicle (Paper IV and V).

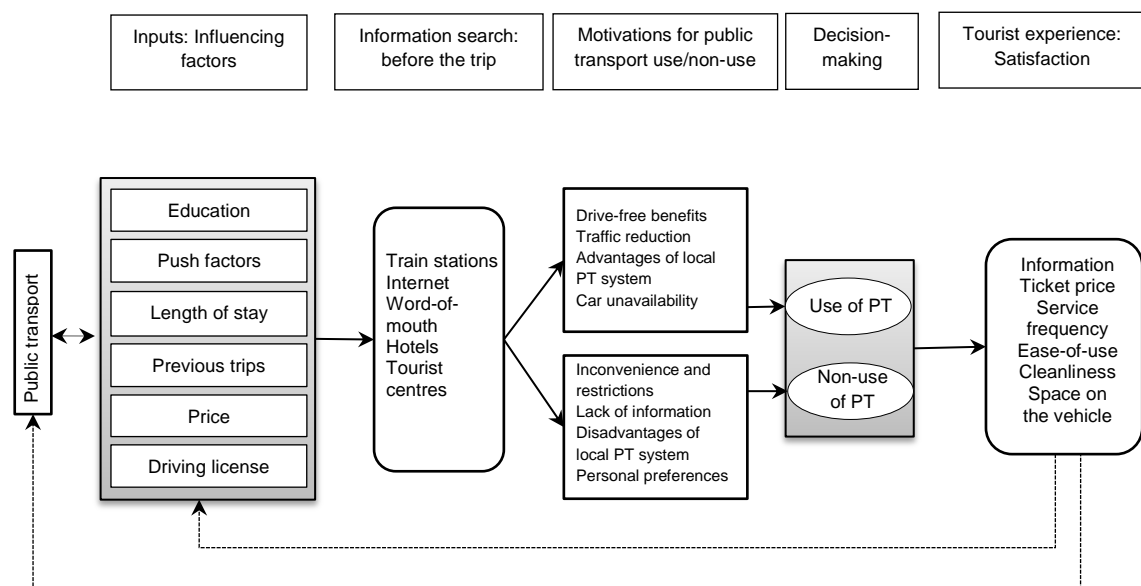


Figure 4: Tourists' use of public transport decision-making model

The factors influencing visitors' choice of transport modes identified in this dissertation indicate both similarities and differences with previous studies. Visitors' choice of transport mode in Munich was examined in two separate surveys, which generated complimentary results. As discussed in Paper I, data from Survey A indicates that the decision to use public transport in Munich is influenced by the visitor's educational level, length of stay in Munich, the number of times the visitor had been to Munich, possession of a driving license, and the importance of price in mode choice. Most of the influential factors identified from Survey A were reinforced in Survey B (Paper III, IV, and V). In general, the visitor-users of public transport tend to be relatively young and well-educated. In line with Kelly, Haider, and Williams (2007), overnight visitors are more likely to use public transport compared to those on day trips. As perhaps expected, visitors of public transport are less likely to have valid driving licenses than the non-users. Interestingly, in contrast with Masiero and Zoltan's (2013), repeat visitors in Munich appear to have lower probability to use public transport than the first time visitors. One reason could be tourists more familiar with the areas are more comfortably navigating around in private transport modes. Moreover, many of the repeat visitors are on business and visiting friends and relative trips and, therefore, may have accessibility to private modes. However, the Push motivational factors to visit Munich (e.g. doing sports, meeting new people, and attending activities) were found to have the similar positive effect on visitor choice of public transport as in the Swiss study (Masiero & Zoltan, 2013). Furthermore, the effect of price on tourist mode choice is again highlighted in the dissertation, confirming previous studies (Chang & Lai, 2009; Hergesell & Dickinger, 2013).

There are a variety of reasons behind a tourist's decision to use public transport (e.g. Dallen, 2007; Guiver, Lumsdon, Weston, & Ferguson, 2007; Lumsdon, Downward, & Rhoden, 2006; Stradling, Carreno, Rye, & Noble, 2007). In this dissertation, four motivations were identified, namely drive-free benefits, traffic reduction, car unavailability, and advantages of local public transport. While

the first three motivations resemble what were found in the studies mentioned above, the last one (i.e. advantages of local public transport) is a new finding of this dissertation. The well-developed public transport system in Munich appears to be attractive to the visitors. This suggests that if the public transport is good enough, visitors would use it.

Having an efficient public transport system is only the starting point. To attract more users, the service quality needs to be constantly maintained and enhanced. Measuring passenger satisfaction is important for public transport operators to understand how much customer expectations have been fulfilled and what should be done to improve passenger experience. This dissertation found that visitor satisfaction with public transport is independent from most personal and trip factors. Visitors are generally satisfied with public transport services in Munich. However, improvement in service frequency and distribution of information would be highly appreciated. More importantly, as noted in previous studies, price has an important effect on a visitor's mode choice (Chang & Lai, 2009; Hergesell & Dickinger, 2013). Tourists who used public transport tend to give more weight to costs in choosing a transport mode. Moreover, price is a strongly influential factor on visitor overall satisfaction with public transport. Therefore, having suitable pricing strategies is vital for public transport operators to attract more visitor-users.

5.1.2 THE TARGET VISITOR-USERS OF PUBLIC TRANSPORT

By examining the factors influencing public transport use, it was possible to identify the target visitor-users of public transport in Munich. Previous studies suggested that the visitor-users of public transport are different from the local users (Thompson, 2004). Findings from two empirical studies in this dissertation confirm the distinctive characteristics of the visitor-users of public transport at an urban destination. As also found in previous studies (e.g. Barr & Prillwitz, 2012; Chang & Lai, 2009; Dallen, 2007b), the visitor-users of public transport in Munich tend to be of younger age group and have a good educational background. Apparently, younger and better educated people are more likely to be well-travelled and more familiar with public transport

systems. However, it should also be noted that this group of visitors is often more willing to participate in surveys and thus dominates the study samples.

The target visitor-users of public transport in Munich are overnight international tourists travelling for holiday purposes. Visitors coming to the city for the first time are also potential users of public transport. The fact that the majority of visitor public transport users own valid driving licences show that public transport was a choice even though several factors may lie behind it.

5.1.3 WHAT MAKES AN ATTRACTIVE PUBLIC TRANSPORT SYSTEM TO VISITORS? Identifying the visitors who are most likely to use public transport at destinations enables public transport operators to target the right customers. However, equally important is making the system attractive to visitors. Lumsdon (2006) argued that a public transport network primarily built for utility purposes rather than tourism purposes needs to be modified to accommodate visitors' particular needs. Therefore, areas such as levels of service, types of vehicles, and especially the role of driving staff should be emphasised. Especially in the case of bus, drivers with local knowledge are appreciated (Koo et al., 2010).

Tourism is essentially a service industry where quality is often emphasised (e.g. Chen & Chang, 2005; Erdil & Yıldız, 2011). Similarly, service quality is highly valued by public transport passengers (Tyrinopoulos & Antoniou, 2008). Findings in this dissertation suggest that an attractive public transport system should offer services with high frequency, clean and spacious vehicles, and most importantly, it should be user-friendly. Public transport in Munich was perceived to be relatively easy to use. However, a simplified ticketing system and more English information could be beneficial for new users.

Lack of information was well recorded in earlier research and was again highlighted in this dissertation as an important reason for visitors for not using public transport (Dallen, 2007b; Edwards & Griffin, 2013; Kinsella & Caulfield, 2011). Having an excellent system does not help attracting more users if the

visitors do not know about it. The marketing and promotion of public transport to visitors is thus of great importance.

To encourage a modal shift to public transport, marketing strategies should focus on visitors' experience rather than on the mode. For instance, visitors enjoy a relaxed and care-free ride with the bus (Dickinson & Dickinson, 2006), hence on-board benefits should be emphasised. Tourists tend to look for information from traditional sources (Paper V), public transport information thus should be made available in forms of brochures, leaflets, booklets at train stations, bus stops, accommodations, and tourist centres. In addition, real time information should be accessible through mobile phone applications and the internet. As recommended by Pettebone et al. (2011), younger visitors can benefit from real time traffic condition information (intelligent transport systems), while older visitors value the bus service quality and the travel experience.

One challenge to the delivery of good public transport service is the lack of data regarding the visitor-users (Lumsdon, 2006). The limited knowledge of the market restricts the ability to develop and offer appropriate services and qualities to different customers. Several public transport networks are designed and operated without thorough investigation of existing demand patterns. To develop and offer better services, customer information should be included in the tourism transport planning and marketing process. Establishing benchmarks and monitoring programmes is also critical to determine the levels of demand, user profiles, and user motivation on a regular basis (Hall, 2014).

In addition to direct strategies to promote public transport, sustainable tourist mobility may include other measures such as pricing structure, incentives, taxation, and emissions quota. Integrated land use planning, priority for public transport, and policies to influence attitudinal change could also be used (C. M. Hall, 2014; D. Hall, 2004). Installing parking restrictions, car closures, and offering alternatives to cars are some other possible measurements.

Nevertheless, even with a strong knowledge of the market and extensive information, implementation of sustainable strategies may still fail (Hall, 2011). Determining and implementing sustainable strategies requires involvement of multiple stakeholders (Lumsdon & Owen, 2004). Involved parties, especially the area managers, are interdependent and thus co-operation between them is critical for successful sustainable development (Regnerus, Beunen, & Jaarsma, 2007). Both stakeholders and tourists' views should be considered when planning for sustainable tourism development.

5.1.4 CHALLENGES TO SUSTAINABLE TOURIST MOBILITY

Travelling by public transport has multiple advantages. Train and coach travel are the most carbon-efficient travel options as they produce significantly less greenhouse gas emissions than from car and air travel (Filimonau et al., 2014; Peeters, Szimba, & Duijnsveld, 2007). There are also more social engagement and interaction opportunities while travelling by public transport (Stradling et al., 2007). The dissertation shows that public transport has a great potential in supporting sustainable tourist mobility at an urban destination. However, there are certain challenges to implementing sustainable mobility policies in general and promoting public transport in particular.

Lack of clear objectives, targets, and measures are often some of the problems with sustainable transport policies (Eaton & Holding, 1996). Furthermore, public resistance can be a barrier to the implementation of traffic management (Regnerus et al., 2007). Local politicians require the public support, and hence any policies that may cause people's dissatisfaction would be difficult to implement. In areas where car use is a necessity, reducing car use is not feasible. Reasons for difficulties in implementing traffic management include the lack of knowledge about the recreational use of the area and the interdependence of the actors involved.

Moreover, the ability of tourism attraction managers to influence tourists' transport mode is questionable (Guiver, Lumsdon, & Weston, 2008). In fact, managers tend to have doubts about their influence on the number of tourist arrivals, the type of tourists, as well as the arriving transport modes. From the

management perspective, changing visitors' transport mode arrival is challenging as visitors are believed to determine their mode prior to arrival at the destinations and institutional barriers are significant. Findings from this dissertation indicate that transport mode is an important travel decision and that tourists tend to select the transport mode before arriving at the destination (Paper II). Therefore, it is important for destination management organisations to include information about the local public transport system in the marketing strategies for destinations. Additionally, ongoing market study is necessary to provide information about tourist characteristics, their behaviour and expectations at the destinations so that suitable sustainable tourist mobility policies can be achieved.

5.2 CONCLUSION

This dissertation set out to gain a better understanding of how visitors use public transport at an urban destination. Using Munich as a case study, the research has provided important theoretical and practical implications for tourism and transport researchers and practitioners. Results of this dissertation were presented in five papers, each of which significantly contributes to tourism and transport research. Table 8 summarises the major contributions to the literature by each paper.

Table 8: New findings and major contributions to the literature by papers

Paper	Contributions
Paper I	<ul style="list-style-type: none"> - Provides an overview of studies on tourism and public transport at destinations. - Identifies the main issues discussed. - Identifies the research gaps and suggests topics for future research.
Paper II	<ul style="list-style-type: none"> - Identifies the important factors influencing visitor choice of transport mode and areas visited. - Shows that visitors' use of public transport and areas visited are not necessarily related. - Provides evidence that an efficient public transport system could support visitors' spatial extent of travel at a destination.
Paper III	<ul style="list-style-type: none"> - Recognises the distinction between the visitor-users and non-users of public transport. - Uncovers the motivations for public transport use and non-use. - Highlights the importance of information and accessible and conveniently located train stations and bus stops for visitors. - Indicates that an efficient public transport system can attract visitor-users.
Paper IV	<ul style="list-style-type: none"> - Identifies the main dimensions of public transport services, including the new dimension "accessibility". - Identifies the most important service attributes affecting visitor satisfaction with public transport.
Paper V	<ul style="list-style-type: none"> - Provides important implications for marketing strategies to encourage the use of public transport by visitors at the destination. - Highlights the importance of service improvements, information, and pricing in promoting public transport use in tourism.

As a whole, the dissertation provides insights into the use of public transport by visitors at an urban destination – a topic of little discussion in tourism and

transport research. It identifies the potential public transport visitor-users and their behaviour at an urban destination and analyses the motivations for public transport use and the most influential service attributes on visitor satisfaction with public transport. Besides the research contribution, findings from the dissertation have important implications for public transport operators and tourist destination management, which are relevant not only for Munich but also for other cities of similar conditions. In line with Koo et al. (2010), this thesis shows that public transport could support the dispersal of tourists at destinations. Therefore, to facilitate sustainable mobility and support tourist spatial extent of travel, it is essential for cities to have efficient and well-connected public transport networks. Cities with existing public transport system should reach potential tourist users with appropriate marketing strategies. The efficient public transport system in Munich (Paper IV) contributes to its popularity among tourists in the city. However, the case study of tourist use of public transport in Munich provides important implications for marketing public transport to visitor-users at destinations. Having a visitor-friendly public transport system and attractive pricing strategies is necessary, but most important is making the information widely available and accessible to tourists.

In conclusion, this dissertation is one of the very few studies examining visitor public transport behaviour at an urban destination. Using Munich as an example, the research provides comprehensive understanding of visitor use of public transport at an urban area. Some major conclusions could be drawn, providing answer to the key research question: “How should tourist use of public transport at destinations be encouraged?” (Figure 5). First, there are several factors influencing tourists’ transport mode choice, motivations to use and satisfaction with public transport in Munich. These include demographic, psychographic (motivational factors), trip characteristics, destination features and mode quality evaluation. The target visitor-users of public transport are young and well-educated tourists, who visit Munich for the first time and for holiday purposes. Second, an attractive public transport system has to be easy

to use, comfortable to travel, and offer frequent service. Third, having appropriate marketing strategies is crucial to encourage more use of public transport. Targeting the right visitor group is important and so are pricing and information distribution. Fourth, the dissertation shows that an excellent public transport can motivate visitor use, therefore, contributing to sustainable mobility at an urban destination. Besides, visitor’s decisions on transport mode and areas visited are not necessarily related. This shows that public transport could support visitors’ travel patterns at the destination and thus has a great potential in sustainable urban tourism. Having efficient and well-connected public transport systems is imperative for cities, not only to facilitate sustainable mobility and support tourist spatial extent of travel, but also to improve destination attractiveness. Transport is a part of the tourist experience and satisfaction with the destination. Tourists are more motivated to visit destinations with good public transport network; conversely, destinations with weak public transport systems are less attractive to tourists (Awaritefe, 2004; Thompson & Schofield, 2007). Finally, the dissertation confirms that tourist use of public transport at destinations is a topic of little attention in tourism literature. This research project has brought important contribution to the understanding of tourists’ transport behaviour and shed light on the role of public transport in sustainable urban tourism. However, a number of issues and aspects are left for future research, which are summarised in the following section.

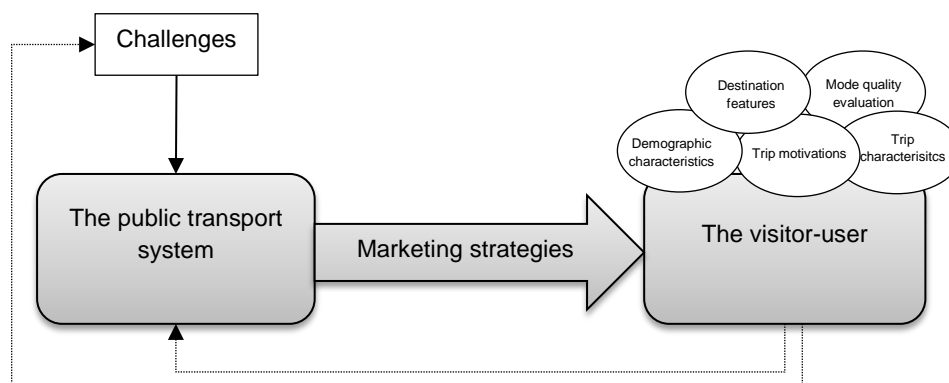


Figure 5: Promoting public transport use in tourism

5.3 FUTURE RESEARCH

This dissertation examines tourist use of public transport in Munich and nearby areas. The findings would have been more complete, had the scope of the studies been extended to other areas outside the Munich region. The thesis highlights the potential role of public transport in sustainable development at an urban destination. However, the situation in rural areas is unclear as urban tourism areas tend to have more advantages for implementation of sustainable transport (Dickinson, Calver, Watters, & Wilkes, 2004). Attractions in urban areas are in many cases located closer to each other and can normally be reached by public transport. In remote rural areas, attractions are potentially more scattered and thus an alternative to car is less likely. Further research could look into how tourists use public transport in other contexts such as suburban and rural areas. Case studies in non-European and/or developing countries could provide further interpretation of the influencing factors on visitor mode choice and satisfaction with public transport services.

The dissertation focuses on the visitor-users of public transport and those who were more likely to use public transport at destinations. Future studies should look at other groups of visitors (e.g. those who often travel by car to better understand the motivations for not using public transport). It would be interesting to understand how willing these tourists are to switch mode. Price was identified as an important attribute influencing visitor choice and satisfaction with public transport in Munich. Research on visitors' willingness to pay for public transport use therefore is an interesting research direction. Furthermore, ticketing systems were found to be one of the main problems for public transport visitor-users in Munich, hence future research could examine how an integrated and user-friendly ticketing system could be achieved.

The research suggests that visitor choice of public transport is independent from areas visited. However, it is unknown which mode tourists use to reach which areas. A study of visitor travel patterns and mode use within and around a gateway city is of great interest. Additionally, the connection between mode

of arrival and mode of transport use at destinations is another possible topic for future research.

Further research is also needed to explore the visitors' perception and feelings of responsibility (Dickinson et al., 2009). Another area requires additional attention is the motivation and socio-psychological benefits related to tourism transport (e.g. intrinsic value of the trip, sensitivity to time, and being with others) (Lumsdon, 2006). Comparative studies of tourists and locals in terms of public transport behaviour, expectations, and requirements would also be of great interest to the field. Moreover, studies from the supplier and management perspective (i.e. public transport operators, transport and tourism policy-makers, tourism destination management) would provide important views on the challenges of policies implementation in sustainable tourism mobility.

In conclusion, public transport plays an important role in sustainable tourism mobility. There is a great potential for public transport to be an attractive alternative mode of transport at urban tourism destinations. However, there are remaining challenges that need to be overcome in implementing sustainable transport policies. Most important of all, policies should be demand oriented, and thus knowledge of visitor characteristics and transport behaviour is vital.

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APPENDIX 1: PAPER I

Le-Klähn, D-T., & Hall, C.M. Tourist use of public transport at destinations – A review. *Current Issues in Tourism* (accepted).

APPENDIX 2: PAPER II

Le-Klähn, D-T., Roosen, J., Gerike, R., & Hall, C.M. Modelling tourist choice of transport mode and areas visited at destinations. *Tourism Geographies* (submitted).

APPENDIX 3: PAPER III

Le-Klähn, D-T., Gerike, R., & Hall, C.M. (2014). Visitor users vs. non-users of public transport: The case of Munich, Germany. *Journal of Destination Marketing and Management*. <http://dx.doi.org/10.1016/j.jdmm.2013.12.005>

APPENDIX 4: PAPER IV

Le-Klähn, D-T., Hall, C.M., & Gerike, R. (2014). Analysis of visitors' satisfaction with public transport in Munich, Germany. *Journal of Public Transportation*, 17(3), 68-85.

APPENDIX 5: PAPER V

Le-Klähn, D-T., Hall, C.M., & Gerike, R. (2014). Promoting public transport use in tourism. In S. Cohen, J. Highham, P. Peeters, & S. Gössling (Eds.), *“Understanding and governing sustainable tourism mobility”*, (pp. 208-222). Abingdon: Routledge.

**APPENDIX 6:
INFORMATION HAND-OUT & QUESTIONNAIRE SURVEY A**



Technische Universität München

Visitors' travel patterns and transport mode use in the Munich region**INFORMATION HANDOUT FOR SURVEY PARTICIPANTS**

Hello!/ Guten Tag!

My name is Diem-Trinh Le-Klähn. I am a student at the Technische Universität München. I am conducting this survey as part of my PhD study at the TUM School of Management and the Chair of Urban Structure and Transport Planning.

Project Overview

This research project investigates how visitors travel during their trip in the Munich region with regards to transport mode choices and places visited. I examine where visitors go and which transport modes they use. I seek to understand the factors influencing visitors' transport mode choices and their travel patterns.

Participants of the survey must be visitors (non-residents) of Munich (inner or outer city) as defined in the MVV public transport network attached. Maps of nearby areas and tourist attractions in the region are also provided for your reference.

Guidelines

- Completion of the questionnaire will take approximately 5-10 minutes.
- Your participation in this survey is voluntary and you are free to withdraw at any stage, in which case, your incomplete questionnaire will be destroyed.
- Your answers will be treated as anonymous and destroyed at the completion of the project.
- The results may be used for future conference reports or journal publications and shared with the local transport providers and policy makers.
- Your participation in this survey will be considered as your agreement with the conditions outlined above.

CONTACT INFORMATION

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Technische Universität München

QUESTIONNAIRE

A. TRIP INFORMATION

1. Is this your first trip to the Munich region? ₁ Yes ₀ No

If not, how many times have you previously visited Munich?

2. How many days did you stay in Munich this time?

3. How many days do you have in total for this trip?

4. Who did you travel with?

- | | |
|--|--|
| <input type="checkbox"/> ₁ By yourself | <input type="checkbox"/> ₄ Family / Relatives (with children) |
| <input type="checkbox"/> ₂ Friends | <input type="checkbox"/> ₅ Colleagues |
| <input type="checkbox"/> ₃ Family / Relatives (adults only) | <input type="checkbox"/> ₆ Other (please specify) |

5. What was the main purpose of your visit in Munich?

- | | |
|--|--|
| <input type="checkbox"/> ₁ Visiting friends and relatives | <input type="checkbox"/> ₄ Education |
| <input type="checkbox"/> ₂ Business | <input type="checkbox"/> ₅ Other (please specify) |
| <input type="checkbox"/> ₃ Holiday | |

6. How important was each of the following statements for you as the reasons for visiting the Munich region, with 1 being *not at all important* and 5 being *extremely important*.

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
a Visiting historical and cultural sites	1	2	3	4	5
b Experiencing landscape and nature	1	2	3	4	5
c Trying new food	1	2	3	4	5
d Spending time with my family and friends	1	2	3	4	5
e Better understanding of the German culture	1	2	3	4	5
f Getting rest and relaxation	1	2	3	4	5
g Doing sports	1	2	3	4	5
h Meeting new people	1	2	3	4	5
i Going shopping	1	2	3	4	5
J Attending activities (concerts, festival, etc.)	1	2	3	4	5

7. How did you arrive in the Munich region?

- | | |
|--|--|
| <input type="checkbox"/> ₁ By plane | <input type="checkbox"/> ₄ By bus |
| <input type="checkbox"/> ₂ By car | <input type="checkbox"/> ₅ Other (please specify) |
| <input type="checkbox"/> ₃ By train | |

8. What was your direct departure point to Munich?

- | | |
|---|---|
| <input type="checkbox"/> ₁ Another place in Germany | <input type="checkbox"/> ₅ Oceania |
| <input type="checkbox"/> ₂ Another European country | <input type="checkbox"/> ₆ Asia |
| <input type="checkbox"/> ₃ The United States or Canada | <input type="checkbox"/> ₇ Africa |
| <input type="checkbox"/> ₄ Other parts of America | <input type="checkbox"/> ₈ Other places (please specify) |

B. EVALUATING TRANSPORT MODE

9. When choosing a transport mode, please rate how important each of these attributes is in a scale from 1 to 5, with 1 being *not at all important* and 5 being *extremely important*.

		Not at all important	Slightly important	Somewhat Important	Very important	Extremely important
a	Comfortable	1	2	3	4	5
b	Convenient	1	2	3	4	5
c	Safe	1	2	3	4	5
d	Best priced	1	2	3	4	5
e	Flexible	1	2	3	4	5
f	Eco-friendly	1	2	3	4	5
g	Time-saving	1	2	3	4	5
h	Accessible	1	2	3	4	5
i	Others (please specify)	1	2	3	4	5

C. TRANSPORT MODE CHOICES AND PLACES VISITED IN THE MUNICH REGION

Note: For question 10, 11, 12, please refer to your trip to Munich **this time only**.

10. When did you decide the transport mode for your trip in the Munich region?

- ₁ More than two weeks before coming ₃ During my time in Munich
₂ Within two weeks before coming

11. Where did you go during your stay in Munich **this time** and with which transport mode? Please tick all that apply.

Place	Public Transport	Walking	Cycling	Car	Taxi	Tour bus	Other
Munich inner district (MVV Zone 1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Munich outer district (MVV Zone 2-4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nearby lakes (Chiemsee, Königssee, Tegernsee, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nearby palaces and castles (Neuschwanstein, Linderhof Schloß, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nearby towns (Bad-Tölz, Füssen, Garmish-Patenkirchen, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other cities (Nürnberg, Regensburg, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Alps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. How satisfied were you with your transport mode choice during your trip in Munich?

	Not at all satisfied	Slightly satisfied	Somewhat satisfied	Very satisfied	Extremely satisfied	N/A
a Munich's PT network (U-Bahn, S-Bahn, city bus, tram)	1	2	3	4	5	-
b Regional train (RE, RB, ALX, BOB)	1	2	3	4	5	-
c Long distance trains (ICE, IC, EC)	1	2	3	4	5	-
d Tour bus (coach, city tour bus)	1	2	3	4	5	-
e Bicycle	1	2	3	4	5	-
f Walking	1	2	3	4	5	-
g Car	1	2	3	4	5	-

13. How easy did you find it was to travel around the Munich region?

Very difficult	Slightly difficult	Somewhat easy	Very easy	Extremely easy
1	2	3	4	5

D. PERSONAL INFORMATION**14. Which age group are you in?**

<input type="checkbox"/> ₁ <18	<input type="checkbox"/> ₃ 30-39	<input type="checkbox"/> ₅ 55-64	<input type="checkbox"/> ₇ 75+
<input type="checkbox"/> ₂ 18-29	<input type="checkbox"/> ₄ 40-54	<input type="checkbox"/> ₆ 65-74	

15. Which is the highest level of formal education you have completed?

<input type="checkbox"/> ₁ Primary school	<input type="checkbox"/> ₅ College/University Graduate
<input type="checkbox"/> ₂ Secondary school	<input type="checkbox"/> ₆ Post graduate (Master/PhD)
<input type="checkbox"/> ₃ High school	<input type="checkbox"/> ₇ Other (please specify)
<input type="checkbox"/> ₄ Vocational school	

16. Where are you from?

<input type="checkbox"/> ₁ Germany	<input type="checkbox"/> ₅ Oceania
<input type="checkbox"/> ₂ Other European countries	<input type="checkbox"/> ₆ Asia
<input type="checkbox"/> ₃ The United States or Canada	<input type="checkbox"/> ₇ Africa
<input type="checkbox"/> ₄ Other parts of America	<input type="checkbox"/> ₈ Others (please specify)

17. How would you assess your own financial situation?

Very bad	Bad	Neither good nor bad	Good	Very good
1	2	3	4	5

18. How often do you use public transport at your home residence?

<input type="checkbox"/> ₁ Almost every day
<input type="checkbox"/> ₂ Once or twice per week
<input type="checkbox"/> ₃ Rarely or never

<input type="checkbox"/> ₁ Yes	<input type="checkbox"/> ₀ No
---	--

19. Do you have a valid driving license?**20. What is your gender?**

<input type="checkbox"/> ₁ Female	<input type="checkbox"/> ₀ Male
--	--

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION!

APPENDIX 7:
INFORMATION HAND-OUT & QUESTIONNAIRE SURVEY B



Technische Universität München

Tourists' use of public transport in Munich

INFORMATION HANDOUT FOR SURVEY PARTICIPANTS



Hello!/ Guten Tag!

My name is Diem-Trinh Le-Klähn. I am a student at the Technische Universität München. I am conducting this survey as part of my PhD study at the mobil.TUM Research Centre Mobility and Transport. The project is funded by the Hans-Böckler Stiftung, Germany.

Project Overview

This research project investigates the use of public transport by tourists in the city of Munich, Germany. It seeks to identify their level of satisfaction and the factors influencing the quality of their experience with public transport in Munich. Results of this study are needed to better understand tourists' transport needs and to better respond to their expectations.

Public transport mentioned in this survey refers to these means of transport in Munich: bus, tram, U-Bahn, S-Bahn, and regional trains in and around Munich.

Guidelines

- Completion of the questionnaire will take approximately 10-15 minutes.
- Your participation in this survey is voluntary and you are free to withdraw at any stage, in which case, your incomplete questionnaire will be destroyed.
- Your answers will be treated as anonymous and destroyed at the completion of the project.
- The results may be used for future conference reports or journal publications and shared with the local transport providers and policy makers.
- Your participation in this survey will be considered as your agreement with the conditions outlined above.

CONTACT INFORMATION

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QUESTIONNAIRE

Technische Universität München

A. Your trip in Munich

1. Are you a visitor in Munich?

Yes ₁ No ₂

Please continue with the following questions if you are a visitor in Munich. If you are not, please stop the survey. Thank you for your participation!

2. Is this your first trip to Munich?

Yes ₁ No ₂

If not, how many times have you previously visited Munich?

q2b

3. How many *days* do you plan to stay in Munich this time?

q3

4. Who are you travelling with?

By yourself	<input type="checkbox"/> ₁	Family or relatives	<input type="checkbox"/> ₄
Friends	<input type="checkbox"/> ₂	Colleagues	<input type="checkbox"/> ₅
Partner	<input type="checkbox"/> ₃	Other (please specify)	<input type="checkbox"/> ₆

5. How many people are you travelling with (*except yourself*)?

	number		number
a. Seniors (65+)		c. Children (under 12)	
b. Adults		d. Infants (1-2 years old)	

6. What is the main purpose of your trip in Munich?

Visiting friends and relatives	<input type="checkbox"/> ₁	Education	<input type="checkbox"/> ₄
Business	<input type="checkbox"/> ₂	Other (please specify)	<input type="checkbox"/> ₅
Holiday	<input type="checkbox"/> ₃		

7. Have you used *public transport* in Munich during this visit?

Yes ₁ No ₂

If *yes*, please go to question 9.

If *no*, please answer question 8.

B. Your use of Public Transport in Munich

8. What are your reasons for NOT using public transport in Munich? Please rate how relevant these statements are to you in a scale from 1 to 5, with 1 being *not at all relevant* and 5 being *totally relevant*.

	Not at all relevant	Slightly relevant	Somewh at relevant	Very relevant	Totally relevant
a I travel in a tour group	1	2	3	4	5
b I travel by a car	1	2	3	4	5
c I don't feel comfortable with the crowd	1	2	3	4	5
d I prefer walking or cycling	1	2	3	4	5
e I did not need to use public transport	1	2	3	4	5
f I don't want to be dependent on public transport schedules	1	2	3	4	5
g I travel with children so I think public transport is difficult to use	1	2	3	4	5
h Train stations and bus stops are not conveniently located	1	2	3	4	5
i I don't know how to use public transport in Munich	1	2	3	4	5
j I don't have any information about public transport in Munich	1	2	3	4	5
k Fares are expensive	1	2	3	4	5
l I think it is not safe to travel on public transport	1	2	3	4	5

m	I have mobility restrictions	1	2	3	4	5
n	There is no good connection to where I want to go	1	2	3	4	5
o	Public transport is too slow	1	2	3	4	5
p	Other reasons (please specify)	1	2	3	4	5

Please continue with part D page 4.

- 9.** What are your reasons for traveling BY PUBLIC TRANSPORT in Munich? Please rate how relevant these statements are to you in a scale from 1 to 5, with 1 being *not at all relevant* and 5 being *totally relevant*.

		Not at all relevant	Slightly relevant	Somewh at relevant	Very relevant	Totally relevant
a	I don't have a car in Munich	1	2	3	4	5
b	I don't want to rent a car	1	2	3	4	5
c	Public transport in Munich is convenient	1	2	3	4	5
d	I can't drive	1	2	3	4	5
e	Travelling by car is expensive	1	2	3	4	5
f	Traveling on public transport is cheap	1	2	3	4	5
g	I don't want to drive in unfamiliar cities	1	2	3	4	5
h	I want to contribute to less pollution	1	2	3	4	5
i	I can have more time to do something else on board	1	2	3	4	5
j	I want to get in touch with the local people	1	2	3	4	5
k	I want to enjoy the surroundings on the way	1	2	3	4	5
l	I want to get to know the country's transport system	1	2	3	4	5
m	I was given a free or discount ticket	1	2	3	4	5
n	I was recommended by someone to use public transport in Munich	1	2	3	4	5
o	I think travelling by public transport is a better way to explore Munich	1	2	3	4	5
p	I was taken around by a local in Munich	1	2	3	4	5
q	I want to avoid traffic jam	1	2	3	4	5
r	I want to contribute to less traffic congestion	1	2	3	4	5
s	Public transport in Munich is very accessible	1	2	3	4	5
t	It is difficult to find parking lots in the city centre	1	2	3	4	5
u	Other reasons (please specify)	1	2	3	4	5

- 10.** For what purposes have you used public transport in Munich? Please tick all that apply.

To go shopping	<input type="checkbox"/>	a
To get to tourist attractions	<input type="checkbox"/>	b
To go around Munich for an overview	<input type="checkbox"/>	c
Business related purposes	<input type="checkbox"/>	d
To visit friends and relatives	<input type="checkbox"/>	e
Other purposes (please specify)	<input type="checkbox"/>	f

- 11.** How often have you used public transport in Munich?

Once	<input type="checkbox"/>	1
A few times	<input type="checkbox"/>	2
For all the trips I made in Munich	<input type="checkbox"/>	3

- 12.** What type of public transport have you used in Munich? Please tick all that apply.

Bus	<input type="checkbox"/>	a	Tram	<input type="checkbox"/>	d
U-Bahn	<input type="checkbox"/>	b	Regional train	<input type="checkbox"/>	e
S-Bahn	<input type="checkbox"/>	c	Other (please specify)	<input type="checkbox"/>	f

13. What type of ticket have you used?

Single trip ticket	<input type="checkbox"/> _a	Three-day ticket	<input type="checkbox"/> _f
Single day ticket	<input type="checkbox"/> _b	Bavarian ticket	<input type="checkbox"/> _g
Partner day ticket	<input type="checkbox"/> _c	City Tour Card	<input type="checkbox"/> _h
Week ticket	<input type="checkbox"/> _d	Stripe ticket	<input type="checkbox"/> _i
Month ticket	<input type="checkbox"/> _e	Other ticket (please specify)	<input type="checkbox"/> _j

14. How important it is for you to get trip related information (e.g. departure time, duration, vehicle, number, stations, etc.) *before* the journey?

Not important at all	Of little importance	Somewhat important	Important	Very important
1	2	3	4	5

15. When did you get information for your most recent journey by public transport in Munich?

Before I came to Munich	<input type="checkbox"/> ₁	Just before I started my journey with public transport	<input type="checkbox"/> ₃
During my time in Munich	<input type="checkbox"/> ₂	I didn't look for any information	<input type="checkbox"/> ₄

16. Where did you obtain the information for public transport in Munich?

Train stations and bus stops	<input type="checkbox"/> _a	Other tourists	<input type="checkbox"/> _e
Tourist information centres	<input type="checkbox"/> _b	Local people	<input type="checkbox"/> _f
Accommodation reception	<input type="checkbox"/> _c	Internet	<input type="checkbox"/> _g
Mobile phone applications	<input type="checkbox"/> _d	Other (please specify)	<input type="checkbox"/> _h

C. Your satisfaction with public transport in Munich**17.** How satisfied are you with the following aspects of public transport in Munich? Please rate your satisfaction from 1 to 5, with 1 being *very dissatisfied* and 5 being *very satisfied*.

	Very dissatisfied --	Somewhat dissatisfied -	Neither dissatisfied nor satisfied	Somewhat satisfied +	Very satisfied ++
a Information	1	2	3	4	5
b Ticket price	1	2	3	4	5
c Staff service	1	2	3	4	5
d Punctuality	1	2	3	4	5
e Reliability	1	2	3	4	5
f Service frequency	1	2	3	4	5
g Network connection	1	2	3	4	5
h Convenience of the time schedule	1	2	3	4	5
i Safety on board	1	2	3	4	5
j Space on vehicle	1	2	3	4	5
k Seat availability	1	2	3	4	5
l Cleanliness of the vehicle	1	2	3	4	5
m Comfort while waiting at the bus stops or train stations	1	2	3	4	5
n Accessibility of the train stations and bus stops	1	2	3	4	5
o Accessibility of the vehicles	1	2	3	4	5

18. In general, how satisfied are you with public transport in Munich?

Very dissatisfied	Dissatisfied	Neither dissatisfied nor satisfied	Satisfied	Very satisfied
1	2	3	4	5

19. In your opinion, how *easy* it is to use public transport in Munich?

Very difficult	Slightly difficult	Somewhat easy	Very easy	Extremely easy
1	2	3	4	5

20. Would you recommend your friends to use public transport in Munich?

Yes ₁ No ₂

21. Do you have any comments or suggestions for improving the public transport service in Munich?

D. Your information

Could you please tell me a bit about yourself?

22. Which age group are you in?

<18 <input type="checkbox"/> ₁	30-39 <input type="checkbox"/> ₃	55-64 <input type="checkbox"/> ₅	75+ <input type="checkbox"/> ₇
18-29 <input type="checkbox"/> ₂	40-54 <input type="checkbox"/> ₄	65-75 <input type="checkbox"/> ₆	

23. Which is the highest level of formal education you have completed?

Primary school <input type="checkbox"/> ₁	Vocational school <input type="checkbox"/> ₄
Secondary school <input type="checkbox"/> ₂	College/University Graduate <input type="checkbox"/> ₅
High school <input type="checkbox"/> ₃	Post graduate <input type="checkbox"/> ₆
Other (please specify) <input type="checkbox"/> ₇	

24. Where are you from?

Germany <input type="checkbox"/> ₁	Oceania <input type="checkbox"/> ₅
Other European countries <input type="checkbox"/> ₂	Asia <input type="checkbox"/> ₆
The United States or Canada <input type="checkbox"/> ₃	Others (please specify) <input type="checkbox"/> ₇
Other parts of America <input type="checkbox"/> ₄	

Your place of residence (city and country) is: -----

25. How often do you use public transport in your usual place of residence?

Almost every day <input type="checkbox"/> ₁
Once or twice per week <input type="checkbox"/> ₂
Rarely or never <input type="checkbox"/> ₃

26. Do you have a valid driving license?

Yes ₁ No ₂

27. Do you own a car at home?

Yes ₁ No ₂

28. Do you have health restrictions with any of the following?

Sight <input type="checkbox"/> ₁	Hearing <input type="checkbox"/> ₃
Walking <input type="checkbox"/> ₂	No health restriction <input type="checkbox"/> ₄

29. What is your gender?

Male ₁ Female ₂

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION!

Please kindly leave your contact details (Name, Phone/Email address) for follow-up study. Thank you!
